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UNIVERSITY OF TORONTO

REPORT OF THE DEAN
OF THE
FACULTY OF MEDICINE

SESSION 1939-1940

THE UNIVERSITY OF TORONTO PRESS

UNIVERSITY OF TORONTO

FACULTY OF MEDICINE

Toronto, June 30th, 1940

To the Graduates in Medicine of the University of Toronto.

The Annual Report of the Dean of the Faculty of Medicine for the Session 1939-1940 is, with good wishes and greetings, sent to you herewith.

W. E. Gallie, M.D.,
Dean.

THE ANNUAL REPORT OF THE DEAN OF THE FACULTY OF MEDICINE

W. E. Gallie, M.D., F.R.C.S.

The opening of the session 1939-1940 brought to the Faculty the immediate necessity of determining the wartime policies of the School. The enquiry of the President at Ottawa brought the following reply from the Deputy Minister of Militia:—

"Reference is made to the national emergency which has recently developed and consideration has been given as to how it will affect the numbers of medical doctors who may be expected to graduate during the next few years.

"It is considered advisable that action should be taken to prohibit the appointment of medical students in branches of the service other than medical, and enlistment in any of the services generally, that it may be ensured that those who are now attending medical courses may complete their studies and therefore provide that needs of the civil population and the defence forces continue to be made available.

It is difficult to estimate even approximately the period restrictions, as indicated in the preceding paragraph, may be continued, but it is felt that at present they should be applicable at least to students of the classes expected to graduate in the years 1940-44.

It is also desired to stress the value of training medical sections of the C.O.T.C. and to urge all medical students to enrol and attend the training."

In addition the President was informed that the government considered that it would be unwise, for the present, to make any change in the medical course designed to shorten it, and that consideration would be given to measures to prevent excessive depletion or the disorganization of the staffs of medical schools and hospitals.

Based on these instructions, therefore, the school has cerried on much as in normal times, with the exception that the departure of those members of the staff who have enlisted has laid heavier responsibilities on those who have remained and that certain less important activities have been eliminated. It is the intention of the Faculty, however, to adapt itself wholeheartedly to the necessities of the times and to hold itself prepared for whatever changes of programme the interests of our Country may require.

In accordance with the wishes of the Minister of Militia, the students were encouraged to join the University of Toronto Contingent, Canadian Officers Training Corps, and thus have the opportunity of obtaining qualification as officers in the Canadian Military forces. One hundred and sixty-one medical students enlisted in the C.O.T.C., those in the early years taking the work to qualify them as infantry officers and those in the final two years, that required to qualify them as officers in the medical service.

Four or five hours a week were spent by these students in learning military theory and practice over and above the time required by their ordinary academic studies. They worked hard and conscientiously at both soldiering and acquiring a medical education so that, when they graduated, they would be ready to serve their country as medical officers. The Faculty took cognizance of the extra load these students were carrying and showed this by awarding a bonus up to ten marks to those students reported upon favourably by the C.O.T.C.

Early in the session the Caput expressed the opinion that during war times student civilian activities should be made as inconspicuous as possible. As a result only those dinners and dances that could not be accommodated in Hart House were held outside University property and the annual Daffydil performance was cancelled.

Graduates who have sons and daughters in Medicine will have noted with interest the class lists which were forwarded to each student after this year's examination. Similar lists have been issued by the Faculties of Applied Science, Arts and Dentistry for some years and have been so favourably commented upon that the plan has been adopted in Medicine as well.

One of the most interesting developments of the past year has been the plan for selecting interns suggested and put into operation by the Canadian Intern Board. This Board consists of students in the graduating year in the various Medical Schools in Canada and of prominent men of the profession representing medical schools, hospitals and organized medicine. The Constitution describes its operation as follows:—"Under the present system of appointment of interns there are certain grave maladjustments giving rise to grief among a great number of prospective interns on the one hand and the intern boards of many hospitals on the other hand.

Considerable inconvenience is particularly caused by applicants who on receiving appointments from several hospitals and choosing the hospital of their preference, neglect to inform the other hospitals that they are not accepting their appointments. This neglect at times leaves hospitals with a less complete or inferior staff of interns than they might otherwise have obtained. The same situation is also unfair to other applicants who may thus be kept out of hospitals where they might otherwise have been accepted and due to pressure of times be forced to accept an internship less preferable to him than he deserves and could have if these conditions did not obtain.

Another cause of confusion, expense and worry is presented by the differences in the dates of announcing the appointments by various hospitals, many of which require an immediate reply from the applicant as to whether or not he wishes to accept their appointment.

The National Executive of the Canadian Association of Medical Students and Interns has prepared a plan which is intended to be advantageous to both parties concerned. In the plan under consideration the present relation between applicant and hospital remains essentially unchanged. At the same time the causes underlying the present confusion are eliminated and appointments facilitated by clearing them through a central board."

The function of the Board is to remedy the weaknesses of the present system by assisting both the students and the hospitals to settle this problem in the most satisfactory manner to both parties. According to their plan of procedure, the student makes a written application to the hospitals in which he is willing to accept internship and, at the same time, he notifies the Intern Board, on a Form provided for the purpose, of the order of his preference for the various hospitals to which he has applied. The selection committee of each hospital chooses the interns it prefers from among the applicants to that hospital and names also a number of alternates to provide for the possibility that some of the applicants they have selected may have expressed a preference for some other hospital on their Form to the Intern Board. The Board considers the lists of selections made by the hospitals and the students' choices of preference until the lists of choice have been exhausted. The Board then sends to each hospital the list of those applicants who have been acceptable to that hospital and who have indicated that that hospital is their first choice. If there are stilll some vacancies these are filled from the alternates. On the whole the plan worked well and with a little experience it will probably solve the difficulties of both students and hospitals.

The Charles Mickle Fellowship for 1940 was awarded to Professor Philip Edward Smith, Professor of Anatomy at the College of Physicians and Surgeons, Columbia University, New York, for his outstanding work on the pituitary gland which has led to great advances in the whole conception of pituitary disease.

The annual Mickle Fellowship Lecture for 1939 was delivered on April 5th, 1940, by Professor Charles H. Best, M.A., M.D., D.S.C.Lond., F.R.S., Professor of Physiology in Toronto. His subject was "Blood Clotting, Thrombosis and the Action of Heparin" upon which he has done so much valuable research. This lecture was heard by the most enthusiastic and the largest audience that ever attended a Mickle Lecture.

The Donald C. Balfour Lecture was delivered this year by Professor George Grey Turner of the British Postgraduate Medical School, London, England. It was given on October 11th instead of Lister Day, April 5th, as is the custom, to suit the convenience of Professor Grey Turner, who had been lecturing in South America. The subject of the lecture was "The Transplantation of the Ureters," concerning which the lecturer has made important contributions. He made reference to the fact that pioneer work on this subject had been done here in Toronto by Dr. G. A. Peters, over forty years ago.

Reference has been made in previous reports to the unavoidable necessity for raising the annual fees. The hardship caused by this among the students of limited means has been mitigated by the award of small bursaries in special cases. In the past year 19 such bursaries were awarded in the sixth year, 18 in the fifth, 8 in the fourth, 7 in the third and 3 in the second. They range from $50.00 to $150.00.

Two postgraduate courses were given in the latter part of September, one on physiotherapy and one on fractures. These courses of a week's duration attract a large attendance from all over the country and are evidently serving the purpose for which they were intended. This year a course on traumatic surgery will be given, in the hope that it will be useful to men who are entering the army. In addition to these special postgraduate courses, 109 addresses were given by 59 speakers from the Faculty of Medicine, under the auspices of the Ontario Medical Association.

An account of the various researches that have been going on in this School will be found in the departmental reports. Several indicate that important studies are being made for war purposes. One of the most important is that being conducted by Sir Frederick Banting in search of a solution of the air-hunger that attacks pilots while flying at high altitudes and of the so-called "blackouts" that occur in some pilots when changing direction at the terrific speed at which modern fighter planes travel. Reports on the progress of these studies are naturally only available to the Department of National Defence. Another interesting research is that being conducted by Professor Best on the preparation of concentrated blood plasm for the treatment of shock and haemorrhage. This has now reached a stage at which such large numbers of donors have been tested and selected that a steady supply of the sterile concentrated plasm is available for the casualties when they come.

The important research on silicosis described in previous reports has now reached a stage where a clinical test is being conducted. The favourable results on animals resulting from the addition to the silica laden air of finely powdered aluminium dust has been further supported by the finding that the aluminium therapy has a decidedly favourable effect on the lungs of animals in which silicosis is already established.

The international recognition that is accorded the work of the Department of Medical Research is indicated by the list of contributors to its expenses. They are:

The Banting Foundation
The Department of National Defence
The Josiah Macy Jr. Foundation, New York
The Scottish Rite Masons, Northern Jurisdiction
The Neuropsychiatric Institute, Hartford Retreat
The Rockefeller Foundation, New York
The Eli Lilly Company, Indianapolis
H. MacLean, Merrickville
The Ontario Mining Association

Among the reports of the clinical departments, I direct your attention to that of the Department of Paediatrics. Among many researches is described a clinical experiment, based on long laboratory study, on the prevention of air-borne infection by means of barriers of ultra-violet light. During the past seven months sixty infants have been treated in the specially constructed cubicles used in the experiment and not a single case of cross-infection has occurred. This gives promise to eliminate the chief cause of mortality in infant wards, and indeed suggests a method of prevention of air-borne contagions of all sorts.

The most important permanent staff change during this year has been the appointment of Dr. G. Lyman Duff, Assistant Professor of Pathology under Professor Wm. Boyd, as Professor of Pathology at McGill University. Dr. Duff graduated here in 1929 and immediately joined the staff in Pathology under Professor Klotz. In 1931 he went to Johns Hopkins University on a National Research Fellowship and remained there under Professor MacCallum till 1935 when he was recalled to Toronto. Dr. Duff is a brilliant young pathologist and will make a strong addition to the group of graduates of this school who now hold important posts at McGill.

The call of the army has caused many temporary changes in the staff. The following is a list as of June 30th, 1940:—

With No. 15 General Hospital have gone Colonel C. A. Rae of the Department of Oto-laryngology as Officer Commanding; Lieut.-Colonel W. P. Warner as Officer in charge of Medicine;

Lieut.-Colonel J. A. MacFarlane as Officer in charge of Surgery; Major A. C. Singleton in charge of Radiology; Major S. M. Campbell in charge of Anaesthesia; Majors R. M. Wansbrough, R. W. I. Urquhart, H. M. Gray, D. E. Cannell, and Captains S. D. Gordon, F. G. Kergin, C. Aberhart, A. W. M. White, T. R. Sarjeant, H. E. LeMasurier, H. W. McCart, D. E. Magner, H. E. Rykert and R. C. Dickson. Lieut.-Colonel A. R. Hagerman is District Medical Officer for M.D. No. 2, and on his staff are Major D. L. McLean as District Hygiene Officer and Captain J. W. Brennan as Surgical Specialist on the standing Medical Board. With the Toronto Military Hospital are Lieut.-Colonel K. G. Gray as Officer Command- ing; Major C. H. Watson and Captain P. E. Ireland. With No. 1 Neurological Hospital are Majors H. H. Hyland, E. H. Botterell; Captain J. C. Richardson and Lieutenants C. P. McCormick and G. D. M. Boddington. With No. 2 Casualty Clearing Station are Captain Ian Macdonald and Lieutenants J. R. F. Mills and R. B. Kerr. With No. 4 Canadian Field Regiment, Royal Canadian Artillery, is Lieutenant W. A. Oille. With No. 2 Field Ambulance are Major J. R. Ross and Lieutenant A. L. Chute. With the Royal Canadian Naval Volunteer Reserve is Surgeon-Lieutenant W. G. Rice. At the Camp Borden Military Hospital on the Surgical staff is Lieutenant F. P. Dewar. With No. 8 Detachment R.C.A.M.C. (R.C.A.F.) are Major G. E. Hall and Captain W. R. Franks. With Headquarters Staff, Ottawa, is Major Sir Frederick Banting. With Headquarters Staff, 7th Corps, is Major M. H. Brown, D.A.D.H. Colonel Duncan Graham, the Professor of Medicine, has been appointed Consultant in Medicine at the office of the Director-General of the Medical Services, and is required to spend two days a-week in Ottawa.

Honours have come this year to Professor Alan Brown, who has been elected a Fellow of the Royal College of Physicians, London, (Honoris Causa), to Professor Duncan Graham, who has been elected President of the Canadian Medical Association, to Dr. D. E. Robertson, who is President of the American Orthopaedic Association, and to the Assistant Dean, Dr. E. S. Ryerson, who has been elected Vice-President of the Medical Council of Canada.

It is my sad duty to record the deaths during this year of Major General J. T. Fotheringham, Dr. A. H. W. Caulfeild and Professor J. G. FitzGerald. General Fotheringham was well known to all the graduates of this School and they took great pride in the distinguished position he achieved in the service of his country during the Great War. Dr. Caulfeild died in the midst of a most active and distinguished career. His work on tuberculosis and allergy brought him international recognition. Professor FitzGerald will be remembered as the founder and builder of the Connaught Laboratories and the School of Hygiene. To his vision and great abilities we owe much for the extraordinary position this University occupies to-day and his name will be forever enrolled among those who made this School.

MEDALS, PRIZES, FELLOWSHIPS, SCHOLARSHIPS AND BURSARIES

Awarded by the Senate of the University
Faculty of Medicine

SIXTH YEAR

The Faculty Gold Medal	G. A. Lane
The Faculty Silver Medal	H. Snitman
The Faculty Silver Medal	T. A. Fraser, M.A.
The Ellen Mickle Fellowship	T. A. Fraser, M.A.
The Chappell Prize in Clinical Medicine	F. W. B. Hurlburt, B.Sc.
The William John Hendry Memorial Scholarship in Obstetrics and Gynaecology	N. Littner, B.A.
The Ontario Medical Association Prize in Preventive Medicine	N. Littner, B.A.
The David Dunlap Memorial Scholarship	A. G. Tellson

UNDERGRADUATE

The David Dunlap Memorial Scholarships:	
(*a*) Fifth Year	D. J. Breithaupt
(*b*) Special Third Year	A. W. Smith, B.A.
The Ronald S. Saddington Medal in Pathology	Miss L. E. Whish, B.A.
The James H. Richardson Research Fellowship in Anatomy	H. C. Elliott, M.A.
The John Copp Bursary	D. W. Best, B.A.
The B'nai B'rith Scholarship	W. Wise
The Toronto Women's League of the United Synagogue	P. J. G. Maroosis
The Baptie Scholarship	D. M. Boyd

GRADUATE

The Reeve Prize	H. V. Rice, M.D.
The Starr Gold Medal	P. H. Greey, M.D., B.Sc.
The Alexander McPhedran Research Fellowship in Clinical Medicine	W. F. Greenwood, B.A., M.D.
The George Brown Memorial Scholarship in Medical Science	J. P. Fletcher, M.A., M.D.

The George Armstrong Peters Prize. .E. H. Botterell, M.D.Man., M.S.Tor.
The Faulkner Medal in Psychiatry 1938-1939
D. R. Easton, M.D., F.R.C.S.(C), D.Psych.
The Faulkner Medal in Psychiatry 1939-1940
B. H. McNeel, B.A., M.D., D.Psych.
The Lister Prize in Surgery
A. D. McLachlan, M.D., M.Sc.West., D.Phil.Ox., M.S.Tor.

REGISTRATION OF STUDENTS IN THE FACULTY OF MEDICINE

Session 1940-1941

	Men	*Women*	*Total*
First Year	123	17	140
Second Year	125	5	130
Third Year	108	9	117
Fourth Year	99	11	110
Fifth Year	109	7	116
Sixth Year	126	9	135
D.P.H.	24	3	27
D.R.	3	..	3
D.Psych.	6	1	7
B.Sc. (Med.)	..	..	..
Post Graduate	1	2	3
Occassional Students	8	..	8
Post Graduate Course in Traumatic Surgery:	28	3	31
	760	67	827

DEPARTMENT OF ANATOMY

(*Under the direction of Professor J. C. B. Grant*)

There was little change in the organization of the Department during the past session. It may be noted that Wednesday afternoons are free afternoons for the second year students of medicine. Consequently, undisturbed, the third year students have for some years utilised these afternoons in studying the dissections made by the second year students, thereby reviewing the work that they themselves did during the previous year. This review has taken the form of a one hour lecture and a two hour laboratory period; but it has not been wholly successful. So, during the last trimester of last session, following the lecture, the staff met the class in small groups, each of fifteen students, and conducted question and answer tutorials, thus leaving laboratory periods of one hour. This proved much more acceptable than the continuous two hour laboratory period, and it is the method it is proposed to follow next session.

It is a constant source of regret that the teaching museum should be located so far from the dissecting rooms—accommodation is provided for the museum on the second floor and for the dissecting rooms on the fourth floor, two long flights of stairs apart. It is desirable that the museum should open off the dissecting rooms, thereby allowing the dissector to consult the museum specimens frequently and without loss of time. To some extent the existing disadvantage is being overcome by making duplicate dissections of selected parts and placing them around the walls of the dissecting rooms.

A variety of dissections of the vertebral column, spinal cord and spinal nerves are amongst the important additions recently made for the museum. The display tables in the museum have been more amply labelled, thus allowing specimens to be located with greater ease.

The war has brought about certain changes in the personnel of the staff: Mr. H. E. LeMasurier, senior technical assistant, went overseas as quartermaster of the 15th General Hospital and has since received his captaincy. Dr. W. E. L. Sparks, who for many years has been senior demonstrator of neurology, was called up for military duties early in the session. Dr. Freda Richardson, demonstrator of neurology, proceeded overseas with her husband. Dr. A. D. Rice, demonstrator of gross anatomy, left at the end of the second trimester in order to take over the practice of Dr. T. S. Perrett, a former demonstrator, who was called up for military duties. Miss M. G. Chapman, Richardson Research Fellow, had to relinquish the fellowship soon after the declaration of war in order to assume certain laboratory duties in connection with the troops. Mr. H. C. Elliott was thereupon appointed Fellow in her place, his undertaking being to plot the cell groups in the anterior horn of the spinal cord; in this he is making interesting progress.

Mr. Stephen George, who for 16 years has been a highly reliable, punctual and obliging laboratory attendant, retired at the end of last session on reaching the retiring age.

RESEARCHES

Dr. A. W. Ham and Miss Merritt, with the assistance of a grant from the National Research Council, find that the response described as specific for urine from cancer patients is not so, but is due to a pituitary principle normally present in the urine of older persons. Dr. Ham has continued his work on arterio-sclerosis in rats resulting from the administration of activated ergosterol. Dr. Ham, in collaboration with Dr. Haist, has undertaken an extensive histological study of the effects of injecting a diabetogenic anterior pituitary extract into dogs for varying lengths of time. This study, undertaken at the request of Dr. Best, has yielded a considerable amount of information regarding the pathogenesis of diabetes.

Miss V. Ryder, with the assistance of a grant from the National Research Council, is investigating the tissues of animals suffering from prolonged phosphorous deficiency.

Mr. G. Eidt, with the assistance of a grant from the Banting Research Foundation, is studying the effect of injections of growth hormone on the fractured bones of older animals to see if they speed the process of repair.

Dr. C. G. Smith has studied the influence exerted by sensory impulses from muscles on the response to pain on electrically stimulating the cerebral cortex, and he has located within the spinal cord the path followed by the impulses emanating from the forelimb of the dog. Working with data collected in the department over many years, he has shown that the age incidence of perforation of the articular disc of the wrist joint in man increases steadily from 25 per cent at 35 years of age to 50 per cent at 75 years of age.

He has prepared a series of cross-sections of various parts of the body for the new edition of Morris' Anatomy and has devised a method of mounting these in permanent form.

During the last eight years more than one hundred vertebral columns from subjects of verified age have been collected for investigational purposes. Dr. Grant has begun a study of these, and notes among other points that those who pass the age of forty years very rarely do so without showing degenerative changes about the articular surfaces of the bodies and articular processes of the vertebrae.

Of the sessional demonstrator in Gross Anatomy: Dr. D. D. Carpeneto prepared certain dissections for the artist employed on the new edition of Morris' Anatomy. This artist was working in the Department completing illustrations for the section on the musculature of this text-book, which is being revised by the head of the Department. Dr. E. G. Meyer succeeded in tracing branches of the intercostal and lumbar nerves to the intervertebral discs and posterior longitudinal ligament, thereby confirming in part the work of Roofe. Dr. H. L. Foster investigated the structure of the annulus fibrosus of the intervertebral discs and, using our osteological collection, has made observations on certain variations in the column.

PUBLICATIONS

Dr. J. C. B. Grant has completed the second edition of a text-book of anatomy entitled, A Method of Anatomy. This edition has been extensively revised and preliminary chapters on the systems of the body and about 150 new illustrations have been added. Dr. Grant, in collaboration with Dr. H. A. Cates, has written a Handbook for Dissectors, being a companion to A Method in Anatomy. Both of these books were published by Messrs. Williams & Wilkins in May, 1940.

Dr. J. C. Watt has translated and largely revised Volume II of the fifth English edition of Sobotta's Atlas of Human Anatomy. This deals with the digestive, respiratory, urogenital and vascular systems. This atlas was published by Messrs. Stechert & Company, New York, towards the end of 1939. Dr. Watt has also completed the work on the translation and revision of Volume III, dealing with the nervous system. This is due to be published during the summer.

The late Professor J. P. McMurrich had completed the translation and revision of Volume I of this same atlas, dealing with the bones, ligaments, joints and muscles of the human body. It has been published.

Dr. C. G. Smith has published an article on his researches entitled: The phasic response to critical stimulation, *Journal of Neuro-Physiology*, 1940, Volume 3, pp. 182-187.

Dr. A. W. Ham has published the following articles: Histological Effects of Diabetiogenic Anterior Pituitary Extracts; A. W. Ham and R. E. Haist, *Nature*, 144, 835, 1939.

Coronary and Aortic Sclerosis, Periarteritis Nodosa, Chronic Nephritis and Hypertension as Sequelae to a Single Experimentally Produced Widespread Calcium Precipitation in the Rat. A. W. Ham, *Archives Pathology*, 1940 (Am. Assoc. Exper. Path., p. 10).

The Insulin Content of the Pancreas as influenced by Anterior Pituitary Extracts and Insulin. J. Campbell, R. E. Haist, A. W. Ham and C. H. Best, *Am. Journ. Physiol.*, 129, p. 328, 1940.

Histological Effects of Diabetogenic Anterior Pituitary Extracts. A. W. Ham and R. E. Haist, *Anatomical Record*, 76, Supplement 2, p. 89, 1940.

Physiological Hypertrophy of the Parathyroids, Its Cause and Relation to Rickets. A. W. Ham, N. Littner, E. C. Robertson, T. Drake and F. Tisdall, *American Journal of Pathology*, May, 1940.

Annual Report of the Secretaries of the Banting Research Foundation. V. E. Henderson and A. W. Ham, *Canadian Medical Association Journal*, 42, 404, 1940. *Science*, 91, 362, 1940.

DEPARTMENT OF BIOCHEMISTRY

(*Under the direction of Professor H. Wasteneys*)

There have been no changes in the curriculum during the year. The division into two years of the course given to medical students appears to have been a wise change in spite of the extra courses which it has necessitated, for the students appear to achieve a better knowledge of the subject than formerly. Professor Leslie Young, who replaced Professor Marrian on the staff of the department, has been in charge of the course given to Third Year Biology and B. & M. students. He has also shared with Professor Wynne in the lectures to Fourth Year B. & M. students.

Dr. Wynne has given the lectures in the honour course for students in Third Year Household Economics, Chemistry and the General Course, and he has also given a course in Zymology for Honour Arts and Graduate students.

Mr. B. F. Crocker was in charge of the course for Third Year Dental students.

For the first time we have had students who have graduated in the B. & M. course and who have been completing the intermediate year before proceeding in Fourth Year Medicine. Four of these students spent a minimum of one day per week in research in biochemical problems. This served to introduce them to methods of research and the experience should prove of great benefit to those who return to laboratory research in Medical Science after graduation.

The research work carried on in the department during the session has been separately reported to the President. During the session members of the staff presented papers before scientific societies. Two graduate students completed their fulfilment of the requirements for the Ph.D. degree in Biochemistry.

Since the close of the session some members of the department have undertaken research on war problems.

The total number of students registered in the department during the session 1939-40 was 407. This number was made up of 212 Medical students, 20 students of the B. & M. course, 13 Chemistry, 5 P. & B., 3 B. & P., 5 Biology, 10 General, 37 Household Economics, 22 Household Science, 44 Dentistry, 2 Chemical Engineering and 34 Graduates. Of the graduate students 23 were candidates for the Ph.D. degree, 4 for the M.A. and 7 for the M.S.A. Thirteen were taking Biochemistry as a minor for degrees in other departments, and 10 were taking their major work in Biochemistry.

RESEARCHES

Directed by Professor Wasteneys:

Mrs. Jeanne Manery Fisher, assisted by Mr. S. J. Slinger, has been engaged in attempts to solve the general problem of the distribution of electrolytes in tissues under different conditions. To this end she has improved recognized methods for the determination of small amounts of sodium, potassium and chlorine. The electrolyte changes in embryonic development were studied in fish eggs and some information was also obtained on the permeability and electrolyte content of the egg membranes.

Preliminary studies were made on the diffusibility of chloride and potassium, under certain conditions, from the wall of the gastro-intestinal tract.

The electrolyte changes in the tissues of scorbutic animals (guinea-pigs) were also investigated.

Mr. B. F. Crocker and Dr. Paul Hamilton have continued their work on the use of deuterium in the determination of the extent of protein digestion at different situations in the gastro-intestinal tract. Having devised improvements in the method of accurately measuring small amounts of deuterium they have subjected deutero-protein to peptic hydrolysis in vitro and have determined that deuterium and nitrogen are similarly distributed between the unhydrolysed protein and the soluble products of hydrolysis. They have thus proved that deuterium may be used to label ingested protein and to distinguish between the products of digestion of ingested and secreted protein in the digestive tract.

Directed by Professor A. M. Wynne:

Miss M. Biehn and Miss E. Macpherson have been engaged in an investigation of the synthesis of polysaccharides and lipids by yeast. During the past year Miss Biehn has held a studentship at the National Research Council.

Miss M. Chernovsky and H. Z. Sable have continued the study of the properties and formation of phosphatase in the intestinal mucosa of rats and mice.

Mr. M. Freed has completed his study of the synthesis of glycerides by pancreatic lipase.

J. P. Harshman and C. G. Stewart have made a critical study of the kinetics of the hydrolysis of tripropionin by pancreatic lipase, in relation to the recent theories of Medwedew.

F. L. Root has continued the investigation of toxin production by *C. diphtheriae.*

W. C. Stewart has investigated the energy of activation of the system pepsin-egg albumin.

J. Tuba and I. Motzok have continued the investigation of the properties and formation of phosphatases by different species of yeast.

Directed by Professor L. Young:

Mr. A. D. Barton has been engaged in the study of the chemistry of the aryl hydrogen sulphates. The synthesis of these compounds has been investigated, and a new method for the preparation of their derivatives with organic bases has been developed. This work has been undertaken in order to pave the way for a biochemical investigation of the formation of aryl hydrogen sulphates in the animal body.

Dr. L. Young and Miss A. Britton have made a study of the metabolism of the polycyclic hydrocarbon, phenanthrene. From the urine of animals to which this compound has been administered it has been possible to isolate two crystalline derivatives of phenanthrene. A study of the chemical constitution of these compounds has been undertaken. Evidence has also been obtained which suggests that the urine of animals receiving phenanthrene contains at least two other derivatives of this compound besides those already isolated. Dr. L. Young has continued his study of the structure of a naphthalene derivative which he isolated from the urine of rabbits receiving naphthalene.

PUBLICATIONS

FISHMAN, W. H.: Studies on β-glucuronidase. II. Factors controlling the initial velocity of hydrolysis of some conjugated glucuronides. *J. Biol. Chem.*, Vol. 131, No. 1, Nov., 1939.

HEARD, R. D. H. AND WINTON, S. S.: Use of the dietary anoestrous adult rat for the assay of the oestrus-inducing gonadotrophic substance. *J. Physiol.*, Vol. 96, No. 3, p. 248, 1939.

DEPARTMENT OF HISTORY OF MEDICINE

(*Under the direction of Professor Jabez H. Elliott*)

The course of lectures prescribed was given to the three senior years. Following last years course on the development of medicine in general, this year was devoted to a presentation of the history of military medicine, surgery and hygiene with particular reference to outstanding periods in the growth and development of medicine and surgery in general and bringing it down to the great war 1914-19.

As representative of Canada on the Permanent Committee of the International Association of History of Medicine and Vice-President of the American Association of History of Medicine, a report was made on the teaching of Medical History in the Medical Schools of Canada.

As Chairman of the Section of Historical Medicine of the Canadian Medical Association, programmes were prepared for two sessions of that Section, in which excellent papers were presented by medical historians from various provinces.

In August 1939 suitable greetings were sent to the Hotel

Dieu Quebec on the occasion of the 300th anniversary of the founding of the Hospital.

In June 1940 I was present at the session held to mark the Fortieth Annual Meeting of the Canadian Tuberculosis Association.

For the lectures on military medicine and surgery a further series of lantern slides was prepared and added to the growing collection for teaching.

DEPARTMENT OF HYGIENE AND PREVENTIVE MEDICINE

(Including the Sub-Department of Chemistry in Relation to Hygiene)

(*Under the direction of Professor D. T. Fraser*)

The enrolment of graduate students in the course for the Diploma in Public Health for the session 1939-40 numbered twenty as compared with seventeen last year. The following provinces were represented: Nova Scotia, Quebec, Ontario, Manitoba, Alberta, British Columbia. Sixteen students were on fellowship, of whom twelve were Rockefeller Foundation fellows and three Connaught Laboratories fellows. Including the students of this year, the total number enrolled since 1911 is 201.

As previously, courses of instruction in bacteriology, immunology and medical protozoology were given to these students in the course leading to the Diploma in Public Health and also to suitably qualified graduate students of whom there were eleven.

In accordance with the plan adopted in this Department the class of 137 students in the fifth year in medicine was divided into groups. In the absence on military service of Dr. M. H. Brown and Dr. D. L. MacLean the number of tutorial groups was reduced to five. The added numbers in each group reduces the effectiveness of the tutorial method of instruction.

The field course for fifth year medical students was held in the spring and fall. This undertaking has increased in magnitude so that now approximately forty members of the

Department of Health, Ontario, and the Department of Public Health, Toronto, assist in the instruction and the conduct of the field visits.

Laboratory courses and lectures were given to students in the second year Pharmacy, second and third year Household Science and Household Economics and to students in the School of Nursing. The numbers of students in each of these groups has materially increased. The total increase in students is 75 which has taxed the resources of the teaching staff.

The enrolment for the session has been as follows:

Graduate students (20 Candidates for the Diploma in Public Health)	31
Faculty of Medicine, Fifth Year	137
Faculty of Household Science, Second and Third Years	29
Faculty of Arts, Second and Third Years	105
Ontario College of Pharmacy, Second Year	131
School of Nursing	78
	511

RESEARCHES

Mr. R. J. Wilson has again held the appointment of fellow in this Department. He has continued his studies in staphylococcus. He has investigated the factors operative in the formol detoxification of staphylococcus exotoxin. His studies have resulted in the production of staphylococcus toxoids several times more potent than those formerly prepared. A second large outbreak of staphylococcal food poisoning in Hamilton, Canada, has been fully and thoroughly investigated and reported in the Canadian Public Health Journal. A summary of epidemiological and laboratory data obtained during investigation of the several major outbreaks was presented at the Sixth Pacific Science Congress in July of 1939. Mr. Wilson has explored the use of Hornibrook's case in hydrolysate for the cultivation of H. pertussis with a view to its use in the preparation of vaccine for human use.

Dr. Ella Kuitunen, who is working under a grant from the Banting Research Foundation, has conducted a comprehensive survey of the intestinal parasites and of enterobius infection in children, with the kind co-operation of Dr. Alan Brown and Dr. Gladys Boyd. Among 438 children, 33.5% were positive for some species of protozoan or helminth parasites. The incidence of enterobiasis (pinworm) as found in one institution was surprisingly high, namely approximately 70%. A survey of intestinal parasites in adults was carried out at the Toronto Western Hospital with the cooperation of Dr. H. K. Detweiler and Dr. T. A. J. Duff. It was shown by stool examination that parasitic infection was present in 29% of 324 persons including one case of Entamoeba histolytica, one case of Diphyllobothrium latum and one case of Taenia saginata. Swab examination of 306 adults showed 9.8% infected with pinworm.

In the past academic year Mr. J. W. Fisher investigated the nutritional elements which are responsible for the development of the Vi agglutinogen in a number of strains of Bact. typhosum. His findings may result in important changes in the method of preparation of typhoid vaccine.

Dr. Frieda Fraser has, in collaboration with Dr. Hannah and Dr. Doyle at the Riverdale Isolation Hospital, investigated the incidence of agglutinative types of strains of haemolytic streptococcus in a small scarlet fever ward at the Riverdale Isolation Hospital. By means of the technique employed it is possible to show the transfer of agglutinative types from one patient to another in the same ward. The amount of exacting technical work was very great. Swabs from physicians, attendants, and patients are taken at frequent intervals and all strains of haemolytic streptococcus are grouped and typed. In view of the emphasis being placed on aerobic transfer of infection by certain investigators Dr. Fraser's studies assume importance in assessing the factor of direct transmission. Haemolytic streptococci of the same types as those infecting the patients were found in cultures from the nurses' hands immediately after attending the patients. These types were not obtained from cultures of the hands immediately before, nor from the nurses' throats.

Because of his previous experience with streptococcal infection, Dr. Ronald Hare initiated studies, on the outbreak of the war, on wound infection and, in particular those due to the haemolytic streptococci. An attempt is being made to investigate the probable source of the organism in order to evolve methods for the prevention of this form of infection. Progress so far made would indicate that these organisms are not present in the wound at the time of infliction but probably find their way in from exogenous sources of which the most important are the nose and throat of human carriers and other infected cases in the same ward. In view of this it is hoped that methods may be worked out by which these infections may be prevented.

Dr. Hare has continued his studies on the virus of influenza. The fluctuations which occur in the neutralizing antibody for this virus have been followed in persons of different age groups over a period of three years. Fluctuations are probably due to repeated infections with the virus. There is little evidence that the presence of the neutralizing antibody will protect the host against influenza or that its absence or low titre is any index of greater susceptibility to infection. Experiments have also been continued on active and passive immunity. His studies have shown that contrary to what has been supposed, it has been found that variations in the antigenic constitution of the virus are of small moment provided that a sufficiently large dose is employed for immunization.

Dr. Donald Fraser with the assistance of Dr. E. L. Davey, who has been added to the staff in the absence of Dr. Brown, carried out investigations in the field of diphtheria. Various preparations of toxoid have been investigated. The most satisfactory method of assessing the antigenicity of these preparations, the dosage and the interval used, is in groups of children. These studies were made possible through the co-operation of Dr. F. Cuddy from Whitby, Dr. J. A. Ruttel from Dresden and the late Dr. James Roberts and Dr. J. E. Davey from Hamilton. It has been clear that one of the chief factors involved in the effectiveness of toxoid is the length of interval between the injections. There is reason to believe that modifications in the preparation of this prophylactic and the way in which it is administered will result in simpler and more effective use of diphtheria toxoid.

Through the co-operation of Dr. A. B. Moffat, Director of Laboratories, Department of Public Health, Toronto, the diphtheria carrier survey in school children is being continued. No carriers have been found in the examination of 3,284 nose and throat cultures in school children examined from December 5th, 1939, to June 15th, 1940. No diphtheria carriers have been discovered since December 1937 in 4,000 cultures examined. This is an extraordinary finding but is consistent with the fact that cases of diphtheria are very rare in Toronto.

Dr. K. Sternbach, who is working under a grant from the Banting Research Foundation, is studying the action of certain new chemical preparations on Gram-negative cocci in mice.

Dr. P. J. Moloney is continuing his studies in diphtheria toxoid. At the present time an alum toxoid preparation of a new character is on trial in human beings. If it proves effective, this new preparation has distinct advantages over the alum toxoids at present available. In conjunction with Mr. Orr, Dr. Moloney has further extended his work on certain bile constituents on diphtheria toxin. A summary of this work was given before the Royal Society of Canada.

Dr. Edith Taylor described a new Schick test toxin. Results of this study have been published in the Journal of Immunology. Dr. Taylor is continuing her work in exploring synthetic media for the preparation of diphtheria, tetanus and B. welchii toxins. This latter research is stimulated by the urgency of the requirement of toxins and toxoids of high potency for the production of antitoxins and for the active immunization of troops with suitable toxoids of the gas gangrene group of bacteria.

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DEPARTMENT OF MEDICAL JURISPRUDENCE

(*Under the direction of Dr. K. G. Gray and Professor W. L. Robinson*)

There was no change in the arrangements for this course during the past year. The legal part of the course consisted of ten lectures given by myself. An attempt was made to deal with the most of the common legal problems encountered by the medical practitioner. Particular attention was devoted to the procedures for committal of mentally ill patients, as it is thought that this is a subject of increasing importance.

K. G. Gray

The pathological aspects of this subject were dealt with as usual in my lectures. Guest lecturers included Doctor E. R. Frankish, Doctor Smirle Lawson, Supervising Coroner and Professor Jocelyn Rogers.

W. L. Robinson

DEPARTMENT OF MEDICINE

(*Under the direction of Professor Duncan Graham*)

Clinical Instruction. No major changes have been made in the general plan of undergraduate instruction in Medicine. The enlistment of six members of the staff of the department in the Canadian Active Service Force necessitated a rearrangement of the teaching and hospital duties of certain other members of the staff and the making of certain temporary appointments, but clinical instruction was given according to schedule.

Staff. The Department records with deep regret the death in May last of one of its senior members, Dr. A. H. W. Caulfeild, Senior Demonstrator in Medicine and Attending Physician in the Special Tuberculosis Clinic of the Toronto General Hospital.

The following members of the staff joined the Canadian Active Service Force: Drs. H. M. Gray, A. R. Hagerman, H. H. Hyland, J. C. Richardson, H. E. Rykert and W. P. Warner. Dr. Warner was appointed Officer in Charge of Medicine in the No. 15 Canadian General Hospital. Before proceeding overseas he served for a time as Consulting Physician to the Director General of Medical Services. Unfortunately, he was taken ill overseas and was invalided home. The Department is pleased to report that he is making a very satisfactory recovery from his illness. Drs. Gray and Rykert are attached to No. 15 General Hospital and Drs. Hyland and Richardson to the Neurological Unit. Dr. Hagerman was appointed first as Officer Commanding the Toronto Military Hospital and later to his present post as District Medical Officer to Military District No. 2. During the last half of the Session the Head of the Department has served as Consulting Physician to the Director General of Medical Services, devoting two days each week to this work.

At the beginning of the Session Dr. R. B. Kerr, a former Resident Physician with two years' post graduate training in London, England, joined the staff of the department as Junior Demonstrator in Medicine. The following have been given temporary appointments on the staff of the department to assist in carrying on the work of those on active service: Drs. C. R. Burton, T. A. Crowther, A. H. Squires and J. A. Walters.

During the past year Dr. W. A. Oille has been a Fellow in Medicine and Resident Physician of the Toronto General Hospital. In June last Dr. Oille joined the Army and is serving in the C.A.S.F. as Medical Officer with the 4th Canadian Field Regiment, Royal Canadian Artillery. The Alexander McPhedran Research Fellow in Clinical Medicine during 1939-40 was Dr. J. L. A. Fowler.

Dr. R. C. Dickson, who was a Fellow in Medicine and Resident Physician in the Toronto General Hospital during the year 1938-39 and had planned to continue his post graduate training in England during the year 1939-40, enlisted in the C.A.S.F. at the outbreak of war and is attached to No. 15 Canadian General Hospital overseas.

RESEARCHES

The outbreak of the War and the enlistment for Active Service of certain members of the staff of the Department has seriously affected work in the field of clinical investigation. The study of certain problems has had to be suspended and work on others curtailed. Nevertheless, definite progress has been made.

Dr. Cleghorn and his associates, Dr. Fowler and Mr. Clarke, have continued their studies on the functions of the adrenal cortex and on the effects of synthetic cortical hormone treatment in cases of Addison's disease. The cause of the fall in blood pressure in adrenal insufficiency has been investigated. In adrenalectomized animals it has been found that the splanchnic blood vessels react in an apparently normal fashion to nerve stimulation and to vasoconstrictor drugs, which goes to show that the fall in blood pressure in adrenal insufficiency is not due to a failure in the capacity of the peripheral blood vessels to contract. The occurrence of certain electrocardiographic changes, the development of cardiac arrhythmis, and a fall in blood pressure following the administration of pituitrin to adrenalectomized animals are suggestive evidence of impairment of cardiac function as a cause of the fall in blood pressure in adrenal insufficiency.

Blood and extracellular fluid volume studies, now being conducted in conjunction with Dr. J. K. W. Ferguson of the Department of Pharmacology, have contributed further evidence in support of cardiac failure as the cause of cardiovascular collapse in adrenal insufficiency. A preliminary report of this work was presented at a meeting of the Royal Society of Canada.

In the last Annual Report reference was made to the clinical trial of desoxycorticosterone acetate — synthetic adrenal cortical hormone—in the treatment of patients with Addison's disease. Twelve cases of Addison's disease have been treated with this synthetic hormone for periods of six to twenty-three months. It has been found that the therapeutic effect of 5 mg. of the synthetic hormone dissolved in 1 c.c. of sesame oil is equivalent to that of 10 c.c. of a potent aqueous extract of the adrenal cortex. The synthetic hormone was given intramuscularly, or subcutaneously in the form of implanted pellets. Four patients feel well and are doing a full day's work; two patients enjoy considerable, if restricted, activity; one patient has died, and one has entered a remission in which no treatment is necessary. The other four patients have done poorly and require supplemental therapy with an aqueous cortical extract, which indicates that the synthetic hormone, desoxycorticosterone acetate, does not represent a complete substitution therapy in Addison's disease. Despite this shortcoming, the synthetic adrenal cortical hormone marks an important advance in the treatment of Addison's disease from the standpoints of convenience, cost and continuance of treatment of Addison's disease, as all aqueous cortical extracts have an evanescent action.

Working under a grant from the National Research Council, Drs. Cleghorn and Fowler, in conjunction with Dr. P. H. Greey of the Department of Bacteriology, have been studying the effects of sulphanilamide compounds in shock and their efficacy in the treatment of gas gangrene infection in animals. Definite progress is being made in this War problem.

Drs. Richardson and Hyland have made a very careful study of the clinical and pathological findings in a series of cases of subarachnoid and intracranial haemorrhage caused by "berry" aneurysms. Dr. Hyland, in association with Mr. Goodwin and Dr. Hall of the Department of Medical Research, has published the first report of their study of the electroencephalographic changes in the brain of patients suffering from epilepsy. It is to be regretted that the War has interrupted this field of investigation.

Drs. Fletcher and Wallace Graham have published a valuable report entitled "Complications of Diabetes Mellitus with Special Reference to Cause and Prevention". The report is based on 1100 cases of diabetes mellitus admitted to the Toronto General Hospital between the years 1933 and 1938. In this series 114 patients died; 14 in coma and 100 without coma. A review of the 14 coma deaths goes to show that infection was the precipitating factor in six cases and neglect of proper dietetic and insulin treatment in eight cases. Deaths without coma were due to vascular disease in 48 per cent and to infection in 29 per cent. The report clearly shows that the high fat diet employed in the treatment of our diabetic patients had not contributed in any appreciable degree to the development of vascular degeneration. The essential factor in prevention of cardiovascular complications is the constant maintenance of sugar-free urine and of a fasting blood-sugar percentage between 0.1 and 0.15 by carefully controlled dietetic and insulin treatment, the eradication of focal infection and the instruction of patients particularly in reference to the prevention of repeated infections and in the proper care of the feet. This report of Drs. Fletcher and Graham received special comment in the editorial section of the British journal The Lancet in February last.

Drs. Dauphinee and Kerr have investigated the therapeutic and toxic effects of sulphathiazole, one of the newer derivatives of sulphanilamide. It has been found: (1) that sulphathiazole is an effective drug in the treatment of pneumococcal pneumonia but from present evidence cannot be considered superior to M. & B. 693 (sulphapyridine); (2) that toxic manifestations, particularly nausea and vomiting, are less severe with sulphathiazole than with sulphapyridine but drug rashes are more severe and drug fever more common. It has been reported that this new drug sulphathiazole is effective against staphylococcal infections. In our experience so far there appears to be little evidence that sulphanilamide, sulphapyridine or sulphathiazole materially affects the clinical course of the infection in cases of staphylococcal pneumonia or in cases of staphylococcal infection with abscess formation. Observations have been made on four cases of anuria resulting from the use of sulphapyridine, particularly in respect to findings in these cases and methods of treatment of this complication.

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DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY

(*Under the direction of Professor William A. Scott*)

I have the honour to present the following report of the work of the Department of Obstetrics and Gynaecology for the academic year, 1939-1940.

The changes in the curriculum have now been completed, and we feel that the teaching is on a much more satisfactory basis. The students are given an opportunity for more substantial training in the practical work of this department, especially in Obstetrics, and with this added opportunity for training the examination has become more exacting. It is the feeling of the Department that the graduating students are better fitted for general practice than they were in the past. The facilities of St. Michael's Hospital and the Toronto Western Hospital are being used to a greater extent for teaching purposes, with great advantage to both students and Department. The practical instruction to the Fifth Year is carried out entirely in these hospitals, the Sixth Year practical work being done in the Toronto General Hospital.

The Summer Course for a limited number of students who have completed their Fifth Year is still carried on and offers great advantages to the students able to take it. In the Fall of 1939 a limited number of students who had completed their Fourth Year returned to the city five weeks before the opening of the session and took the practical work of the Fifth Year before the session opened. As this appeared to be a satisfactory procedure it will again be carried out during the coming fall.

RESEARCHES

Dr. W. G. Cosbie and Dr. J. R. McArthur continue their work in collaboration with Dr. G. E. Richards in the radiological treatment of gynaecological carcinoma. Dr. Nelson Henderson continues his work in collaboration with the Department of Pathology on the routine work of gynaecology, as well as continuing investigation of certain special subjects. Dr. M. C. Watson continues to direct the work in Endocrinology.

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DEPARTMENT OF OPHTHALMOLOGY

(*Under the direction of Professor W. H. Lowry*)

The members of the teaching staff have been most faithful in their duties. The students have been regular in their attendance and have shown interest in their studies and this interest on their part showed up in their examinations.

RESEARCHES

The Department of Pathology under Dr. MacDonald and assisted by Dr. Hodgson have sectioned and reported upon quite a large number of specimens which have come from the General Hospital and various other sources throughout the province. Our collection of valuable slides for study has been thus added to.

Dr. MacDonald has read papers at the American Ophthalmological Society. Dr. Johnston read a paper at the Canadian Medical Association Meeting. Drs. Hill, Wright, Hodgson, Johnston and Morgan are reading papers at the Canadian Medical Association Meeting being held in

June in Toronto, Dr. MacDonald being chairman of the Section on Ophthalmology.

Dr. H. Macrae is undertaking special research work in association with Sir Frederick Banting in the Banting Institute.

PUBLICATIONS

Six cases of Lindau's Disease; four verified and living, by Dr. A. E. MacDonald.
Lesions of the Macula, by Dr. C. E. Hill.
The normal and pathological vitreous humour, by Dr. T. H. Hodgson.
The use of fascial sutures in the treatment of Ptosis by Dr. W. W. Wright
Sulfanilamide in Ophthalmology, by Dr. J. F. A. Johnston.

DEPARTMENT OF OTO-LARYNGOLOGY

(*Under the direction of Professor G. M. Biggs*)

The appointment of Dr. Hoyle Campbell as a Junior Demonstrator was the only addition to the staff of instructors at the beginning of the past session. This appointment was very welcome and has been a great aid in carrying on the Service both in the Indoor and in the Out-Patients' Department of the Toronto General Hospital.

Two members of our staff, Dr. Cecil Rae who became Officer Commanding 15th General Hospital and Dr. Howard McCart who became Officer in Charge of Oto-Laryngology in the same hospital, were granted leave of absence and are now on Service overseas. Their assistance as Senior Demonstrators has been greatly missed and greater responsibilities have been thrown on other members of the staff who have, I am glad to say, worked harmoniously throughout.

The instruction to the Fifth Year has been carried on at the Toronto General Hospital where it would be difficult to improve upon the facilities for teaching purposes, when each student in the large groups requires more or less individual assistance. More attention has been given this year to the recognition of the normal anatomy by the student also a working knowledge of the standard hearing tests. This, we hope, will show results by increased interest in his sixth year work.

The attendance and interest of the graduating class at the lectures and at the clinics was very gratifying. The course of clinics in the Out-Patients' Department, Toronto

General Hospital was used daily for instruction purposes, one teaching clinic a week at St. Michael's Hospital and one also in the Hospital for Sick Children. So that all groups of the graduating class might become acquainted with special methods of examination, one lecture was devoted to illustrations and demonstration of instruments used to-day in all standard hospitals by Oto-Laryngologists and an explanation given of their possibilities as an aid to the Departments of Medicine and Surgery in diseases of the respiratory tract and of the oesophagus. I refer to the use of the Laryngoscope, the Bronchoscope and Suspension Laryngoscopy.

RESEARCHES

During the year Dr. Howard Burnham has continued his investigations of the circulation of the lateral wall of the nose and the reaction of cavernous areas to localized irritation. A number of translite photographs showing the work are on file in the Department. Dr. Angus McLeod has under observation a large group of cases of atrophic rhinitis (ozeana), illustrating the effect of oestro-genic substances used in the treatment locally. His studies are continuing. Dr. J. Grant Strachan is carrying on his research of atrophic rhinitis in children at the Hospital for Sick Children. Dr. Joseph Sullivan is doing experimental work on "The regeneration of bone following operative defects made by different instruments".

Dr. Gregor McGregor and Dr. P. E. Ireland of our staff, have been associated with the Examining Board of Oto-Laryngology during the Session of the A.M.A. at St. Louis in May and the American Academy in Chicago in October. Dr. Ireland gave a course entitled "Surgical Emergencies in Oto-Laryngology" in Chicago in October.

PUBLICATIONS

"Investigation of the Inferior Turbinate Cavernous Tissue, its divisions and its clinical significance". By Dr. Howard Burnham. Paper read at the Canadian Medical Association Convention in Toronto, June, 1940.

"Bronchoscopic Aspects of Carcinoma of the Lung". By Dr. Gregor McGregor. Paper presented before the Academy of Medicine.

"The Use of Sulphanilamide and Sulphapyridine in Infections of the Ear, Nose and Throat". By Dr. Gregor McGregor. Paper presented before the Academy of Medicine.

"The Surgical Treatment of Facial Paralysis". By Dr. Joseph A. Sullivan. Presented before the American Academy of Ophthalmology and Oto-Laryngology, Chicago, October, 1939.

"Routine Hearing Tests in Modern Otology". By Dr. Joseph A. Sullivan. Presented before the Detroit Oto-Laryngological Society, November, 1939.

Discussion of a paper on "Facial Paralysis". By Dr. C. H. McCaskey, Indianapolis, Indiana, read before the Eastern Section of the American Triological Society, Pittsburgh, January, 1940. By Dr. Joseph A. Sullivan.

Discussion of a paper on "Endaural Fenestration of the Horizontal Semicircular Canal." By Dr. Julius Lempert, New York City, read by Dr. Joseph A. Sullivan before the New York Academy of Medicine, March, 1940.

Papers read by Dr. Joseph A. Sullivan before the Annual Postgraduate Course in Oto-Laryngology, University Hospital, Ann Arbor, Michigan, April, 1940.

1. Bell's Palsy.
2. The Surgical Anatomy of the Seventh Nerve.
3. The Role of the Facial Nerve in the Mastoid Operation.
4. The Technique of the Nerve Grafting Operation.

"The Present Treatment of Facial Paralysis". By Dr. Joseph A. Sullivan. Paper read before the Montreal Medico-Chirurgical Society, April, 1940.

"Specialized Technique in Mastoid Surgery". By Dr. Joseph A. Sullivan. Paper read before the Section of Oto-Laryngology, Canadian Medical Association, June, 1940, Toronto.

"The Unsolved Problems of the Nose and Sinuses". By Dr. D. E. S. Wishart. Read before the Rochester, N.Y., Eye, Ear, Nose and Throat Section, January 10, 1940.

"Routine Hearing Tests". By Dr. D. E. S. Wishart. Published in the *Canadian Medical Association Journal*, Volume 42, January, 1940.

"Resume of Literature on Rhinology in Children for 1938". By Dr. D. E. S. Wishart. Published in *The Laryngoscope*, August, 1939, Volume 49.

"Diseases of the Hypo-Pharynx". By Dr. A. H. Veitch. Published in the *American Journal of Radiology*, August, 1939.

DEPARTMENT OF PAEDIATRICS

(*Under the direction of Professor Alan Brown*)

As a result of our observations on the use of barriers of ultraviolet light in the prevention of bacterial spread, six specially constructed cubicles have been set up in the Infant Ward of the Hospital for Sick Children. This enables us to study the use of this new technique in the prevention of cross-infection from one patient to another under practical ward conditions. During the past seven months, no case of cross-infection has occurred among the sixty infants who have been cared for in these special cubicles. In a similar number of cases enjoying the same medical and nursing services but without the advantages of separate cubicles and ultraviolet light barriers, spread of upper respiratory infections has occurred in 9 instances.

In co-operation with the Connaught Laboratories, studies have been made on the types and virulence of meningococcus organisms encountered in cases of meningococcal meningitis. The carrier rate of this organism has been studied in hospitalized children of various ages, the carrier rate being found to be lower than in adults. Various preparations of whooping-cough vaccine have been tested for their ability to protect mice against experimental infection with this organism. A whooping-cough immune rabbit serum is being developed for use in passive immunization against and treatment of this disease. Work is continuing on a comparison of the chemotherapy and serum treatment of pneumonia and various types of meningitis.

Studies are being conducted upon the heart in rheumatic fever. These consist of the taking of electrocardiographs using chest leads, measurements of changes in heart size, graphic registration of the heart sounds, and measurement of potassium in the blood.

The Department of Psychological Medicine is rendering valuable service to many of the welfare agencies which deal with the so-called problem child. The underlying cause of many of the behaviour problems encountered has been found and corrected, with the result that many of our future citizens who otherwise might become a public liability are developing as normal children.

Much work has been done on the chemical estimation of vitamin B_1 in various Canadian foods. In the method used the vitamin B_1 is extracted from the substance being assayed by the use of a base exchange column, then oxidized to thiochrome and determined by measuring the fluorescence produced on exposure to ultraviolet light. In a number of instances the B_1 content as determined chemically has agreed with that found biologically. Further work is being done to check the chemical estimation of this vitamin against the biological determination.

The vitamin C content of various citrus fruit juices and tomato juices has been determined. It was found that on the basis of Toronto winter retail prices the juice obtained by sieving Canadian factory canned tomatoes is as economical a source of vitamin C as is freshly extracted California orange juice.

Observations have been made on the effect of vitamin K on the prothrombin content of the blood in infancy. It was found that many infants born from supposedly normal mothers have a decreased prothrombin content in the blood, in some cases as low as that found in cases of haemorrhagic disease of the newborn. The administration of vitamin K by mouth to pregnant women, beginning one week before the expected date of confinement, produced a normal prothrombin content in the infant's blood. In 6 consecutive cases of hæmorrhagic disease of the newborn the administration of vitamin K intravenously brought about an increase in blood prothrombin and cessation of the hæmorrhage. In one case vitamin K has been administered intramuscularly with resultant cure. In the past, our treatment of hæmorrhagic disease of the newborn has been by blood transfusion, in some cases more than one transfusion being required to control the bleeding. By the use of intravenous and probably by intramuscular injection of vitamin K the hæmorrhage can be stopped rapidly at the first indication of bleeding, a blood transfusion being unnecessary except in those cases where previous loss of blood has been large enough to lower the haemoglobin in the infant's blood.

Studies on the effect of diet on the pregnant women, the infant and the woman's milk are continuing. In this observation the Department of Obstetrics, University of Toronto, the Dietetic Department of the Toronto General Hospital, and the Visiting Homemakers' Association are co-operating with our department. Up till the present, observations have been made or are progressing on 400 cases. We have found that in comparable groups of pregnant women those having a good diet show much less anaemia, infections and toxaemia, and a greatly decreased incidence of stillbirths, miscarriages and prematures than occurs in those on a poor diet. In addition, the mothers on a good diet show a much greater ability to nurse their infants than do those on a poor diet. Through the generosity of an anonymous Toronto businessman funds have been made available to supplement the diet of a certain number of pregnant women who up till the fifth month of pregnancy had been on a poor diet. The daily addition of 1 egg, 1 orange, 4½ ounces of canned tomatoes, 1½ pints of milk, 1 ounce of cheese and 1 ounce of wheat germ to the poor diet previously consumed by this group of women raised their obstetrical rating from the low of the poor diet to that enjoyed by the good diet group. A summary of the obstetrical rating during pregnancy, labour and post-partum, which also takes into account the condition of the infant, made by the attending obstetricians without knowledge of the woman's dietetic history, is given below.

Of those women on a poor diet throughout pregnancy, the obstetrical rating was 'Excellent' or 'Good' in 53%; 'Fair' or 'Bad' in 47%; on a good diet throughout, 'Excellent' or 'Good' 89%; 'Fair' or 'Bad' 11%; on a poor diet up to approximately 5 months of pregnancy then supplemented to make a good diet, the obstetrical rating was 'Excellent' or 'Good' in 91%, 'Fair' or 'Poor' in 9%. In the above rating, 'Excellent' signifies a good record throughout pregnancy, confinement and puerperium; 'Good'—only minor complications; 'Fair'—major complications, and 'Bad'—serious complications.

Members of the staff of the Department of Paediatrics are taking all possible steps to bring to the attention of Canadian physicians and the Canadian people the latest information on nutrition and its great importance in this time of national crisis.

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16. The Treatment of Diabetes in Children, Gladys Boyd, *Can. Med. Assoc. Jour.*, 42: 438, May, 1940.
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18. Vitamin C content of citrus fruit and vegetable juices, Wilhelmina M. Johnstone, *Canadian Hospital*, June, 1940.
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REPORT OF THE DEPARTMENT OF PATHOLOGICAL CHEMISTRY

(*Under the direction of Professor Andrew Hunter*

The changes in the Department's teaching schedule, referred to in my last report, have proved in practice to be not unsatisfactory; and the general revision of the content of its courses has certainly been of benefit. A new departure has been the introduction into the fifth year of a systematic course in methods of blood analysis. The time for this course was found in the hours assigned to clinical laboratory work. It consisted of from twenty to twenty-five meetings of one hour each, and was given in each trimester to one-third of the class. The course has appeared to fill a useful purpose; and, in spite of the fact that its subject-matter was not included in the final examination, it excited among the students a satisfactory amount of interest.

The staff of the Department has suffered a temporary loss through the departure, in February, of Dr. (Major) R. W. I. Urquhart for military service overseas. This has thrown additional work on Professor Nicholson and Dr. Selby, each of whom has taken over a part of Dr. Urquhart's departmental duties.

The number of students registered in the Department during 1939-40 was 258. Of these 118 were fourth year medical students, 136 were fifth year medical students, and 4 were graduate students. All of the last group were taking Pathological Chemistry as their major subject for the degree of Ph.D.; one of them completed his course and graduated in June.

The Department has carried out as usual the routine determinations of basal metabolic rate required by the Surgical and Obstetrical services of the Hospital. The total number of such determinations was 272. These were made on 182 patients, of whom 166 were surgical and 16 obstetrical and gynaecological. In addition to this service, the Department carried out about 1500 routine urine examinations for the University Health Service.

Drs. Nicholson, Urquhart and Selby have continued their work on kidney function and experimental nephrosis, studying in particular the effects of damage to the distal convoluted tubules produced by uric acid. The number of experiments performed has, of course, diminished since the departure of Dr. Urquhart for service with the Army Medical Corps; but enough has been accomplished to show that the chief effect of the damage was a diminution in the rate of excretion of creatinine and inulin; that of urea remaining practically unaltered.

Dr. Nicholson, in co-operation with Dr. Holman of the Department of Bacteriology, has done further work upon the relationship between staphylococcus injections and carbohydrate metabolism. Certain modifications of the high carbohydrate diet in use have allowed the feeding period to be prolonged. As a result some animals have shown in their carbohydrate tolerance breaks of such a degree, that high fasting blood sugars and slight glycosuria have resulted.

Dr. Woodward, continuing his study of the specificity of arginase, has isolated the product of the action of liver extract upon argininic acid, and has identified it as α-hydroxy-δ-amino-valeric acid. This affords the final proof that argininic acid is actually susceptible to the action of arginase. Under suitable conditions as much as 90% of the substrate has been observed to undergo hydrolysis. The pH optimum of the reaction has been shown to be the same as for arginine itself, and to be similarly affected by cobalt.

Mr. Gornall has devoted his attention to the problem of urea formation in the liver. In this connection he has worked out a colorimetric method for the determination of citrulline. By the use of this method he has obtained proof—hitherto lacking—that liver slices do actually, under certain conditions, convert ornithine into citrulline.

In the same connection there has been discovered a new colour test for arginine, which, although not so delicate as the well-known Sakaguchi reaction, has the advantage of much greater stability. The possibility is now being studied of applying this test as a colorimetric micro-method of arginine determination.

The Department is co-operating with Dr. F. I. Lewis, of the Department of Surgery, in an inquiry concerning the occurrence of gastric or pancreatic enzymes in the abdominal cavity after the perforation of a peptic ulcer.

The Department is co-operating also with the Department of Medical Research in a study of the effects of high altitudes upon the blood and the respiratory metabolism of aviators. Several members of the staff have already interrupted their personal researches to take part in this project, and the others are prepared to do so whenever the occasion may arise.

Co-operation with the Department of Medical Research is represented again in the work of one of its Fellows, Mr. C. McArthur, who is conducting his research work in, and under the direction of the Department of Pathological Chemistry. Mr. McArthur, in the hope of adding to our knowledge of the chemical mechanism of atherosclerosis, has worked out, and has applied to human pathological material, methods for the isolation and identification of the lipides, particularly the cholesterol esters, of atheromatous deposits. These methods have already led to the isolation of two fatty acids not hitherto found in such material, one of which has been identified as linoleic acid.

It is perhaps worth mentioning that some time has been devoted to the modification (and, it is believed, the improvement) of certain methods used clinically for the determination of the urea and the non-protein nitrogen of the blood.

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S. H. Jackson, T. F. Nicholson and W. L. Holman, *Journal of Pathology and Bacteriology*, Vol. L, p. 1-9, 1940.

DEPARTMENT OF PATHOLOGY AND BACTERIOLOGY

(*Under the direction of Professor William Boyd*)

Last summer Dr. G. Lyman Duff was appointed to the Chair of Pathology at McGill University. Dr. Duff distinguished himself both as a teacher and as an investigator, and the Department has suffered a great loss in his departure. His place was taken by Dr. Desmond E. O. Magner. Immediately after the outbreak of war, however, Dr. Magner was appointed to No. 15 General Hospital, R.C.A.S.F., so that for the greater part of the past year the Department has been without his services. Dr. J. D. Duffin, Senior Fellow in the Department, has stepped into the breach, and has carried on Dr. Magner's work in the autopsy room as well as his teaching in the Fifth Year.

The Department has been fortunate in having two voluntary assistants during part of the year. Dr. J. Harold Shaw, holding a Travelling Fellowship of the Rockefeller Foundation, has spent 9 months in the Department, and Dr. R. C. Sniffen has acted for 6 months as Voluntary Fellow. Both have proved themselves very helpful.

The course in General Pathology recently established in the Third Year has hitherto consisted only of lectures. This year a laboratory course has been added, and both the lectures and the direction of the laboratory work have been undertaken by Dr. W. L. Robinson, who has also assisted with the laboratory work in the Fourth Year.

The work on the reconstruction of the Museum, alluded to in previous reports, is being continued. The Cardiovascular Room has been completed, and work on the Bone Room has been begun. The idea of using large viewing boxes for collections of X-ray films and photomicrographs has been developed, and promises to be an important feature of the museum. A number of clinicians have given valuable assistance in selecting the films for display, more particularly Dr. Robin Pearse (Kidney Room), Dr. R. M. Janes and Dr. L. W. Thompson of Weston Sanatorium (Lung Room), and Dr. E. H. Botterell (Brain Room).

RESEARCHES

Investigations have been carried out on the following subjects: Subacute myocarditis (Dr. J. D. Duffin), Periarteritis nodosa (Dr. J. P. Wyatt), Biliary cirrhosis (Dr. W. G. Rice), Paget's disease with sarcomatous change (Dr. W. B. Charles), A comparison of struma lymphomatosa and granuloma of the thyroid (Dr. W. D. Stevenson), Chorionepithelioma in the male (Dr. W. G. Bigelow), and Hutchinson-Boeck's disease and generalized sarcoidosis (Dr. R. C. Sniffen).

THE DIVISION OF BACTERIOLOGY

During the past year the course in Bacteriology was started in the first trimester, instead of in the second. This arrangement has been found particularly satisfactory to both the student body and staff. In connection with the practical demonstrations to the medical students Dr. J. C. Romeyn has done work of outstanding value which we feel will set the standard for a long time.

RESEARCHES

A systematic search for chemotherapeutic compounds to be used against the staphylococcus has been conducted in co-operation with the Department of Medical Research. The full in vitro and in vivo testing of new compounds prepared under the direction of Dr. C. C. Lucas in the Biochemical division of the Department of Medical Research was made possible through a grant from the Banting Research Foundation. Many new compounds have been investigated and much worthwhile information has been gathered, but a satisfactory compound has not yet been found. Recently the scope of this investigation has been broadened by arrangements with Parke, Davis and Company, whereby compounds synthesized by their chemists were made available for testing, thus increasing the speed with which this field can be covered. A highly satisfactory collaborative programme has been worked out and Parke, Davis and Company have further assisted the project by a generous donation.

Aided by a grant from the National Research Council, Dr. P. H. Greey has investigated the chemotherapeutic possibilities of some of the more active sulphonamide drugs in gas gangrene produced experimentally in the smaller laboratory animals. In association with Drs. J. L. A. Fowler and R. A. Cleghorn of the Department of Medicine, the problem was further studied in dogs, and the effect of sulphonamide drugs in animals suffering from shock determined. Under the experimental conditions used these drugs failed to exert a curative effect on gas gangrene due to Cl. Welchii.

Dr. P. H. Greey is acting on the subcommittees on gas gangrene and on blood storage of the Associate Committee on Medical Research of the National Research Council. He took part in a symposium on chemotherapy before the Royal College of Physicians and Surgeons of Canada. For his work in this field he was awarded the Starr Gold medal.

Dr. R. M. Price is continuing her studies in bovine tuberculosis. She has accumulated considerable statistical data to show the gradual decrease in the incidence of bovine tuberculosis in children in the Province of Ontario since the adoption of widespread, and more recently, compulsory pasteurization of milk. She is also studying the effect of the avian type of the tubercle bacillus in experimental animals, notably the domestic cat, and the type of allergy developed by this animal as a result of infection with controlled doses of this bacillus. She is continuing her cultural studies. In the summer of 1939 Dr. Price visited research laboratories in Great Britain and the Scandinavian countries. Owing to the approach of the outbreak of hostilities in Europe, she was compelled to leave Copenhagen, where she was observing the work of Dr. K. A. Jensen on mutation of types of tubercle bacilli, sooner than anticipated. She is at present attempting to duplicate Dr. Jensen's positive findings.

Dr. J. C. Romeyn and Dr. P. H. Greey have studied the relative value of different materials used for wrapping instruments, dressings and other surgical equipment. It was found that bacterial spores passed readily through the factory cotton commonly used to keep such goods sterile. It was determined which materials were most impervious to bacterial spores. This information was of special value to the Canadian Red Cross in connection with the sterile goods being sent to the troops overseas, and has also found practical application on the wards of the Toronto General Hospital.

Dr. J. F. Stecker studied the accuracy of the Laughlen test for syphilis under various conditions of testing, and found the reaction particularly suitable for the rapid exclusion of syphilis in blood donors.

DIVISION OF SURGICAL PATHOLOGY

The Division of Surgical Pathology received 6,341 surgical specimens during the past year, a number just a few short of the record of last year. On the other hand, the facilities for rapid diagnoses in the operating rooms by quick frozen sections have increased the number from 215 to 261. Along with the routine work special investigations have been carried on by Dr. W. L. Robinson on gastric and duodenal ulcers and on islet tumours of the pancreas, by Dr. A. J. Blanchard on glomus and carcinoid tumours, and by Dr. John B. Stecker on dermatofibromata of the skin.

DIVISION OF NEUROPATHOLOGY

The Division has lost the valuable support of Dr. J. Clifford Richardson, Dr. H. H. Hyland and Dr. E. H. Botterell, all of whom are serving with the 1st Canadian Neurological Hospital, R.C.A.S.F. The two routine weekly conferences to discuss autopsy and surgical material respectively, have been continued, and it is a matter of satisfaction to note the keenness of a group of less experienced clinicians to fill the gap in the Division's personnel. The full course of instruction in Neurological Anatomy and Pathology has again been given to the class of Graduates taking the Diploma of Psychiatric Medicine. Dr. Margaret Daley, as Fellow in Neuropathology, has completed the work begun by Dr. M. G. Whillans last year in re-examining and revising the reports on museum specimens. In collaboration with Dr. E. H. Botterell, she has added a collection of x-ray films for use in the viewing box in the museum. As well as demonstrating in Neuropathology to the Fourth Year, Dr. Daley has helped Dr. Robinson as Demonstrator in General Pathology to the Third Year.

Concentration on War activities and depletion of the Staff of the Division on this account has seriously hampered the undertaking of new research activities during the year. Dr. M. R. Shaver has published an article entitled "Colloid Cysts of the Third Ventricle" in the Archives of Neurology and Psychiatry, March, 1940. Dr. J. Clifford Richardson has collected an interesting series of specimens of muscle from clinical cases of different types of muscular dystrophy. Dr. A. F. Goggio has completed an important research on the cause of contre-coup cortical hæmorrhage in cases of head injury. He has a paper on this subject ready for publication. Dr. Mary I. Tom has collaborated with Dr. J. W. Magladery of the Department of Physiology in an experimental investigation of degeneration in nerve and muscle tissue following (1) transections of the spinal cord and (2) injections of alcohol into peripheral nerves. Dr. Linell attended the 3rd International Neurological Congress at Copenhagen last August, giving a paper on "Acute Hyperthyroidism Associated with a Suprasellar Tumour". He has also reviewed a series of cases of subdural hæmorrhage and has prepared a paper for publication on this subject.

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DEPARTMENT OF PHARMACOLOGY

(*Under the direction of Professor V. E. Henderson*)

The teaching in this Department has shown another improvement, in part due to a somewhat smaller class that enabled somewhat smaller groups of students being taken for our Socratic discussions. The students, however, show a lack of initiative, curiosity and interest which is hard to overcome.

RESEARCHES

Research has proceeded satisfactorily. Professor Lucas with a research student from the Department of Chemical Engineering, Mr. E. D. Maher, has been making a detailed study of the isolation of strychnine; and with Dr. W. E. Brown of the anaesthetic properties of ethyl propyl ether and its estimation in anaesthetic mixtures. Dr. Brown will report on this study at the meeting of the Canadian Medical Association. Largely as a result of the experiments of Dr. Lucas, a paper was published on the assay and definition of cyclopropane. This study was undertaken for the benefit of the British Pharmacopoeia.

Dr. Ferguson has made a study of certain respiratory reflexes, which is now in press. He continued his study of the control of uterine movements. He has also developed methods for the study of blood and tissue fluids, which has been applied in conjunction with Dr. Cleghorn in adrenal insufficiency. This study was reported to the Royal Society of Canada. Last summer a study was made with Dr. Black of Swarthmore College on the transport of carbon dioxide in the blood of fresh water fish and an opportunity to complete this study was afforded by the invitation of Prof. L. Irving to visit Swarthmore for the month of April. This study will soon be published.

Dr. Bonnycastle has been following up his study of the effects of drugs on normal blood pressure and in experimentally produced hypertension. Working with Dr. Ferguson he has also completed a study of the effects of drugs on the parturient uterus.

Dr. Rytel, supported by the Canadian Society for the Protection of Science and Learning, has been studying under Dr. Ferguson's direction the course of action of certain purified digitalis glucosides.

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DEPARTMENT OF PHYSIOLOGY

(*Under the direction of Professor C. H. Best*)

An advanced course in physiology has been given to the graduates of the Biological and Medical Sciences course (Third Year Medicine—Second Part), and thus for the first time to a class of students who had already completed their medical work in this subject. Teaching of the medical students proceeded in much the same way as last year.

The first reaction to the war situation in September was that all researches other than those intimately concerned with the problems of military medicine should be discontinued. It soon became apparent, however, that only a limited number of these problems were available and that certain peacetime researches should be continued until the military authorities should see fit (1) to advise that problems suggested to them by our staff should be attacked, or (2) to suggest other problems to us. A number of war researches have been initiated during the year. The concentrated serum project in which various members of this department have been interested has been described elsewhere.

Lectures on heparin and thrombosis, the prevention of diabetes, on experimental shock, and on the concentrated serum project have been given during the year by the Head of the Department. The Hughlings Jackson Memorial Lecture in the Montreal Neurological Institute, lectures before the Medical Students' Undergraduate Association of McGill University and the McGill branch of the Alpha Omega Alpha Society, lectures during the celebration of the fiftieth anniversary of the founding of the University of Minnesota Medical School, a lecture before the New York State Medical Society and one to the Boylston Medical Society at Harvard Medical School, were delivered. Invitations to give the Robert Campbell Memorial Lecture at Queen's University, Belfast, and the John Mallet Purser Lecture at Trinity College, Dublin, were received.

RESEARCHES

With the aid of Miss H. J. Bell, Dr. R. E. Haist and Dr. Best have continued their researches on conditions affecting the insulin content of the pancreas. They have found that the administration of insulin to fasted animals or to those receiving either a diet rich in fat or a balanced ration produces a fall in the insulin content of pancreas. The most dramatic effects are obtained in the fasted or fat fed animals which receive insulin. Dr. Haist has shown that this effect of dietary changes can be produced in the complete absence of the pituitary gland. He has assisted Dr. A. W. Ham in extensive studies on the histological effect of anterior pituitary extracts.

In Dr. N. B. Taylor's section research was continued upon renal hypertension; very interesting results in this field were obtained last year. Two papers were published—one last autumn, the other this spring—upon the effects of encasing the kidney in a cast, and thus preventing hypertrophy of renal tissue, after removal of the opposite kidney. Increasing the renal work by dietary means while the kidney was prevented from enlarging by means of a cast caused an increment in blood pressure above that caused by a cast alone. The work planned for this year met difficulties in execution. In the first place Dr. Ian Maclachlan, who had come to the department with the intention of putting in a full year, joined the army in the early winter. Secondly, Dr. Taylor's illness from February to June terminated, for the academic year, all research work in his section.

The biophysical section, under the direction of Dr. D. Y. Solandt, has continued much of the research work on which an interim report was made last year, and has initiated several new lines of investigation. Mr. W. D. Gray has completed his study of the myoneural junction and post-tetanic facilitation. Mr. J. S. Wenzel devised and constructed equipment for determining the sensitivity of various tissues to excitation by galvanic, faradic and various frequencies of sinusoidal electric current.

The time factor of accommodation (λ) has been measured on a large number of human subjects and methods for the routine determination of this quantity have been improved. Similar measurements have, for the first time, been made on single-fibre nerve-muscle preparations in amphibians and mammals through the use of micromanipulation equipment provided by a grant from the American Philosophical Society of Philadelphia.

Investigative work on the properties of denervated muscle has continued and has been facilitated by a substantial grant from the National Foundation for Infantile Paralysis of New York. Mr. J. W. Scott has completed his study of the relation of the "reaction of degeneration" to the Sherrington phenomenon in denervated muscle. Mr. J. D. Brown has designed and constructed a needle thermocouple of unique design for the measurement of the tissue temperatures encountered in a study of frostbite. The biophysical section has co-operated with other members of the departments of Physiology and Physiological Hygiene in work in which biophysical equipment was required.

Dr. E. T. Waters has continued his investigations on canine anaphylaxis. A study has been made of the conditions governing the production of passive sensitization in the dog. While shock can be demonstrated in actively sensitized dogs, whether or not their sera contain precipitin antibodies, successful production of passive sensitization has been obtained only when the sensitized donor animal possesses these precipitins.

Heparin, in crystalline condition, has been isolated from the blood of dogs in anaphylactic shock by Dr. Waters and Mr. L. B. Jaques. Using the same isolation procedures they have been unable to isolate any heparin from the blood of normal dogs. The heparin obtained from the blood of the shocked animals is identical with that which we have isolated from the liver of normal dogs. It differs chemically from beef heparin and it is a more potent anticoagulant. This clearly demonstrates, what had not been suspected, that different species may possess different heparins. With Dr. A. L. Chute Dr. Waters has shown that, as in anaphylaxis, there is a decrease in the histamine content of the plasma when minute amounts of rattlesnake venom are injected into rabbits. Dr. Jean P. Fletcher and Dr. Waters made unsuccessful attempts to obtain a crystalline derivative of the product obtained from glycogen with a glycerol extract of muscle. The identity of this product is therefore still in doubt. Some preliminary experiments were made on the conditions affecting the precipitation of proteins with solutions of ferric and potassium alums. In collaboration with Dr. C. H. Best and Dr. E. W. McHenry tests have been made of the effectiveness of histaminase preparations, of both kidney and intestinal origin, in inhibiting histamine and anaphylactic shocks. Histaminase had no ameliorative effect. We are thus unable to support the conclusions of others who have claimed for histaminase a rôle in inhibiting the shock due to histamine and to anaphylaxis.

Dr. A. L. Chute has carried out a number of experiments, in conjunction with the staff of the Banting and Best Department of Medical Research, in which the oxygen requirement of the isolated perfused brain has been studied with the view of determining whether this technique is useful in studying the question of oxygen want in aviators. A series of experiments on the estimation of histamine in the blood of shocked animals has also been undertaken. The major portion of Dr. Chute's time, however, has been spent in connection with the blood serum bank for the treatment of war casualties. Through his half time appointment at the Hospital for Sick Children an opportunity has been afforded to test the serum in some cases of shock.

Dr. E. Fidlar has continued experiments on blood platelets in co-operation with Dr. Waters. Heart-lung preparations have not yielded satisfactory evidence of production of platelets by the lungs. Such recovery as did occur could be interpreted as due to the disintegration of clumps. A further study is being made of the behaviour of platelets in anaphylactic shock and related states.

Dr. James Campbell's investigations in collaboration with the Head of the Department, Dr. Haist and Dr. Ham, have shown that insulin can protect the insulin-secreting mechanism from the destructive effects of the anterior pituitary gland extracts. In collaboration with Mr. D. F. Pen, Dr. Campbell has developed a satisfactory test for diabetogenic activity, using guinea-pigs. A test using mice is also under investigation. The fractionation of extracts with diabetogenic activity is now being investigated.

Mr. L. B. Jaques has discovered a new enzyme, which destroys heparin. This enzyme, heparinase, can be prepared from rabbit liver. It is probably responsible for the rapid destruction of heparin *in vivo*. For the work on these heparin problems, use has been made of the facilities of the Connaught Laboratories. Mr. Jaques has continued his studies on blood clotting and has collected further evidence regarding the enzymic nature of thrombin. Mr. Jaques spent considerable time in the autumn term testing out and establishing the cat toxicity test, devised by Dr. McHenry. During the winter some time was spent on heparin production and on the comparison of methods of heparin assay begun last year. More recently an investigation of the production of thrombin was begun.

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DEPARTMENT OF PSYCHIATRY

(*Under the direction of Professor C. B. Farrar*)

The teaching programme has conformed essentially to that of last year when certain changes were made for the purpose of utilizing the greatest possible amount of clinical material through the fourth, fifth and sixth years, with corresponding reduction in the number of hours for lectures. This method seems desirable in view of the very limited time available for teaching psychiatry. All the courses as summarized in my report dated July 4, 1938, have been continued.

The graduate course leading to the Diploma in Psychiatry was successfully completed by six physicians. The Faulkner medal for highest standing was awarded to Dr. B. H. McNeel.

RESEARCHES

In our research division, conducted jointly with the Department of Medical Research work has progressed, although somewhat retarded by staff changes owing mainly to men entering military service. Four parallel lines of investigation on series of early cases of so-called schizophrenia are being carried out. These are, (1) clinical; (2) biochemical; (3) electro-encephalographic; (4) psychological. In each of these suggestive findings have been recorded, but the work must be carried considerably further before any formal report should be made.

On the research staff Dr. J. G. Dewan, who recently returned from Cambridge where he obtained the degree of Ph.D. in biochemistry, having also received the Diploma in Psychological Medicine from the Royal College of Physicians, has had charge of the biochemical investigations. Dr. L. D. Proctor was added to the staff for clinical investigation on a part time basis. Miss K. Robb in charge of occupational therapy in the research unit resigned and was replaced by Miss Pauline Tancock, a graduate of the Department of Occupational Therapy, University of Toronto.

Changes in the Department during the year include the resignation of Dr. C. H. McCuaig, associate, occasioned by his appointment to head the Department of Psychiatry in the Faculty of Medicine, Queen's University; the promotion of Dr. M. V. Jackson from demonstrator to associate; the appointment of Dr. J. E. Sharpe, who succeeds Dr. McCuaig as chief of staff at the Toronto Psychiatric Hospital, as demonstrator, and the addition of Dr. J. G. Dewan as research fellow.

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DEPARTMENT OF RADIOLOGY

(*Under the direction of Professor G. E. Richards*)

No changes have occurred in the Staff of the Department except that with No. 15 General Hospital has gone Major A. C. Singleton, on leave of absence from the University as Assistant Professor of Radiology.

Developments in the field of Radiology have been continuous over the whole period of the past ten years—to such an extent has this been the case that there have been few years indeed which have not seen the introduction of some new device or method having a valuable application in one or more branches of medical practice. The task of passing the essentials of these methods along to undergraduate medical students has been complicated by the fact that although the subject itself has been rapidly expanding the time allotted for its presentation to the students has been rather drastically curtailed. The effect of changes in the time available and the manner in which clinics are now arranged has for the past three years at least been decidedly unfavourable, so far as the teaching of Radiology is concerned.

To some extent it may be a fact that certain Radiological procedures are highly specialized and partake more of the type of subjects suitable for post-graduate rather than undergraduate teaching and this has been taken into consideration in planning the course in Radiology as it is at present.

Recent advances include the method of Laminography which has now been developed to a point of considerable value in the examination of tissues or organs in layers, i.e., body sections of any desired thickness and at any desired level. A very useful modification of this procedure is the "seriescope" by which two pairs of stereoscopic films, one pair of which are vertical and one pair horizontal, are superimposed and studied in a special apparatus. By this means all possible levels or "body sections" can be brought into focus "serially". Its chief application up to the present has been in the study of cavities, etc., in pulmonary diseases.

The campaign against the hollow spaces of the body still continues so that practically no hollow organ remains in the body which cannot be investigated by the use of one or other of the available opaque media. At present the most intense activity is directed towards the spinal canal until there is a danger that the impression may be created that the only possible cause of pain in the back is a displaced intervertebral disc. The media available for these studies are not entirely satisfactory and the search is continuing in the hope of finding one which will be both effective as an opaque medium and also entirely free from risk.

In teaching procedures such as the above the only suitable method seems to be by clinical demonstrations to small groups and this is now the only method of teaching in the final year.

In the field of therapy even more striking changes have occurred and this work is covered as thoroughly as time will permit in clinics to the final year and lecture demonstrations during the fifth year.

We regret that no research except clinical research has been possible during the past year.

DEPARTMENT OF SURGERY

(*Under the direction of Professor W. E. Gallie*)

As has been the case with all other departments, the most outstanding event of this year has been the call for personnel to staff the Army Medical Corps for overseas. With No. 15 General Hospital have gone from the Department of Surgery, Lieut.-Col. J. A. MacFarlane, Major R. M. Wansbrough and Captains A. W. M. White, S. D. Gordon, F. G. Kergin, C. Aberhart, T. R. Sarjeant and F. L. Shipp; with No. 1 Neurological Hospital, Captains E. H. Botterell and C. P. McCormick; with the Toronto Hospital, Major C. H. Watson and Captain J. W. Brennan; and with the Camp Borden Hospital, Captain F. P. Dewar. Fortunately the call for surgical officers has come in a more orderly fashion in this war than in the last one and it has been possible to supply them without disrupting too seriously the service of the hospitals and the school. The temporary loss of all these surgeons has, of course, had its effect but so far, by closing the ranks and working harder, those at home have been able to prevent the medical debacle that took place in 1915. This is due, in large part, to the experience gained by both the Army Medical Corps and the University twenty-five years ago.

The urgent call for trained surgeons from all over this country has led us to enlarge the place of training which has been in operation for some years at the General and Children's Hospitals to include also St. Michael's and the Western. This has been made possible by the spirit of co-operation extended by the pathological, medical and gynaecological services of these hospitals and by the strong support given by Dr. G. E. Wilson and Dr. T. A. J. Duff, the heads of surgery there. The present scheme involves to a certain extent an interlocking of the surgical internships of the four hospitals so that none serves the whole of his three year term in one institution. Following a one year rotating internship in Toronto or elsewhere and whatever post-graduate study is necessary to pass the primary examination for the Master's degree or fellowship in one of the Royal Colleges, the candidate applies for a surgical internship in one of the three general hospitals. Whether he obtains an appointment or not depends on his ability to impress the surgical staff of the hospital to which he is applying that he deserves the appointment and is likely to make a successful surgeon. He then enters the first year which, in the case of St. Michael's and the Western, consists of six months in Medicine and six months in Pathology and six at the Hospital for Sick Children. The six men then spend a year as senior house surgeons on one of the surgical divisions, three of these at the General, two at St. Michael's and one at the Western. In the third year the six men each spend two periods of six months among the options, Urology, Neurosurgery and Orthopaedic Surgery at the General. Gynaecology and Urology at St. Michael's and Gynaecology at the Western. It is in this year that the intermingling of the staffs of the various hospitals occurs.

It may be objected that this scheme, which calls for at least four years of post-graduate work, delays too long a young man's entrance into practice. To this there is only the one answer, that competence in surgery cannot be acquired in a shorter time. When this University grants a candidate the degree of Master of Surgery it is not simply awarding him a degree which can be obtained by any clever student by a process of examinations, it is guaranteeing that the candidate has been adequately trained and is, in all truth, a master of his craft.

At the General Hospital the outstanding change in the Department of Surgery has been the organization of an orthopaedic service. The need for this in the past has not been so urgent as many of the junior members of the staff had been trained under the late Professor C. L. Starr and the present head of the department. It has been becoming increasingly evident, however, that if we are to maintain our position in competition with the other great hospitals of Great Britain and the United States we must concentrate the patients in the hands of men who are specially qualified to take care of them and who are willing to devote their whole energies to this branch of the work. The first head of the service is Dr. R. I. Harris and he will train and add to his staff whatever assistance is required.

RESEARCHES

In laboratory and clinical research satisfactory progress has been made.

Dr. Gordon Murray and Dr. J. M. Janes have continued their animal experiments on the use of heparin and have been able to demonstrate that after the section of large arteries the circulation can be maintained in heparinized animals through glass tubes introduced into the ends of the arteries. In the war of 1914, Tuffier suggested the use of tubes dipped in liquid paraffin as a means of maintaining the circulation temporarily. It was seldom, however, that the tube did not plug immediately with thrombus so that the suggestion was of little practical value. With heparin these tubes can be kept patent indefinitely so that in wounds involving such arteries as the femoral it may be possible to re-establish the circulation and so save limbs and lives. Up to the present there has been no opportunity to observe the method clinically but the facts have been communicated to the War Office and it will be tried out.

Dr. H. F. Robertson has studied throughout this year the effect of the continuous direct application of solutions of certain vasodilators on the surface of the heart in animals in which ischaemia of the cardiac wall had been produced by ligation of branches of the coronary artery. Of the various drugs employed the most satisfactory have been certain pancreatic extracts. When these are introduced into the pericardium they cause an immediate and pronounced dilatation of the coronary vessels and if introduced soon enough, a marked reduction in the damaging effect of the ligation of the coronary artery on the cardiac wall. Whether these findings will prove of clinical value remains to be seen. In the meantime a preliminary report of the study has been sent to the Proceedings of the Society for Experimental Biology and Medicine.

Dr. F. R. Wilkinson, working under a grant from the Nemours Foundation, has commenced a study of the effect of the new chemotherapeutic drugs in osteomyelitis in animals.

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Continued progress is being made in the Museum of Applied Anatomy. During the year Dr. Ross McKenzie has made many beautiful dissections designed to illustrate the anatomy involved in the simple fractures. These specimens are of great value in teaching.

This year has seen the retirement of Dr. E. S. Ryerson from the staff of the General Hospital. He continues as an Assistant Professor of Surgery and as Assistant Dean and Secretary of the Faculty but he has relinquished his position of Senior Surgeon at the hospital and head of Ward B. Dr. Ryerson has served the General Hospital long and well and his retirement from the active practice of surgery there is regretted by all.

The post-graduate course on fractures given in the early part of October was well attended and apparently generally enjoyed. This year, because of the war, we propose to give a course on traumatic surgery with special attention to wounds. These post-graduate courses, covering as they do some special branch of surgery intensively are proving attractive to the graduates of our own and other schools and they will be continued.

The staff changes for the coming year are as follows:—

Drs. H. W. Wookey and R. I. Harris from Associate in Surgery to be Assistant Professors.

Dr. G. S. Foulds from Senior Demonstrator to be Associate in Surgery.

Dr. C. R. B. Crompton from Junior Demonstrator to be Senior Demonstrator in Surgery.

Dr. J. R. F. Mills from Resident to be Fellow in Surgery at the Toronto General Hospital.

Dr. F. R. Wilkinson from Resident to be Fellow in Surgery at the Hospital for Sick Children.

Dr. Hugh Norman to be Fellow in Surgery at the Toronto Western Hospital.

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DEPARTMENT OF THERAPEUTICS

(*Under the direction of Professor R. F. Farquharson*)

The general plan of teaching has been continued as in previous years.

Drs. K. J. R. Wightman, J. A. G. Reid and A. W. Bagnall, Senior Internes in Medicine at the Toronto General Hospital, were appointed Assistants in Therapeutics for the year.

RESEARCHES

Dr. A. H. Squires has carried on the study of the effects of long continued administration of large doses of vitamin D and of dihydrotachysterol in treatment of patients suffering from parathyroid tetany.

Dr. R. A. Mustard has investigated changes in the amount of prothrombin in the blood of patients suffering from liver disease and jaundice of varying types. He has studied the effect of administration of concentrates of vitamin K and of synthetic products with similar activity in raising the lowered blood prothrombin and relieving the tendency to haemorrhage found in some of these conditions.

SUB-DEPARTMENT OF ANAESTHESIA

Teaching and term examinations as described in last year's report have been continued with satisfactory results.

SUB-DEPARTMENT OF PHYSICAL THERAPY

The increased time given for the teaching of physical therapy has allowed for more practical instruction in this subject.

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REPORT OF WORK OF BANTING AND BEST DEPARTMENT OF MEDICAL RESEARCH

(*Under the direction of Sir Frederick Banting*)

In September, 1939, the Department of Medical Research unanimously volunteered their services for the investigation of war medical problems. Much of the research work being carried on in this Department could not be discontinued suddenly and as a consequence every effort was made to continue it along with the new problems undertaken.

One of the most important problems facing medical research at this time is that of aviation medicine. The new type of aircraft has far exceeded the physiological endurance of the pilot. A great deal of research is necessary in order that the pilot may (1) fly at high altitudes with efficiency, security and comfort, and (2) safely utilize the manoeuverability of the new high speed fighter aircraft. The Department of Medical Research undertook these problems and was assisted by a grant from the Department of National Defence. The Department of National Defence appointed an interdepartmental Aviation Medical Research Committee, of which the head of the Department of Medical Research was the Chairman. This Committee has been enlarged and has recently become an Associate Committee of the National Research Council. The Department of National Defence has made a grant for the work of this Committee, much of which is being carried out in the Department of Medical

Research. Reports on this work will not be available except to the Department of National Defence and the National Research Council for the duration of the war.

During the course of the year there has been a gradual transfer of the workers in this Department to war problems. The following is a report of the work on pre-war problems:

Dr. W. R. Franks has continued to direct the work of synthesis of a vaccine against carcinogenesis in animals. With the co-operation of Mr. L. F. King, working under an Eli Lilly Fellowship, various oestrogens have also been linked successfully to proteins and their physiological activity studied, with the assistance of Miss M. M. Shaw. Mr. W. N. Keefe has succeeded in conjugating certain azo-carcinogens for immunological study. Dr. H. J. Creech, under the direction of Dr. L. F. Fieser, at Harvard University, has prepared certain derivatives of the polycyclic aromatic hydrocarbon-carcinogens similarly suitable for conjugation.

With the assistance of Mr. G. J. Millar, a study has been made of the resistance of tumour cells to anoxia and glucose lack. Malignant animal tumours can survive anoxia even in the absence of glucose, for four hours or more.

With the assistance of Miss E. Grant, derivatives of various fractions of tubercle bacilli have been developed suitable for protein conjugation. Quantities of four different conjugates have been prepared and are to be tested for immunological activity when an opportunity affords.

With Mr. G. A. Meek, certain serological reactions have been demonstrated on monomolecular surfaces. Studies of the limits of the specificity of these reactions have been undertaken with the use of synthetic chemoantigens.

The work of Dr. G. E. Hall on experimental heart disease, which has been in progress for several years, has been financed, in part, by a further grant from the Josiah Macy Jr. Foundation, New York, who has provided three fellowships for this work.

Dr. C. G. McEachern, Dr. F. H. Smith and Dr. G. E. Hall have studied the influence of different drugs and combinations of drugs on cardiac pain and upon the mortality following coronary artery occlusion. The use of one particular combination of drugs has resulted in a decrease in the mortality approaching the optimum attained only by denervation of the cardio-sensory pathways.

Drs. McEachern, Smith and Janes have also made a comparative study of the cardiac changes occurring in various types of sudden death, asphyxia, drowning, electric shock, coronary occlusion, adrenal insufficiency, etc.

Drs. Janes and Hall have investigated possible visceral-cardiac reflexes and have shown that distension of the gall bladder or upper abdominal region will produce cardiac irregularities. However, when the heart muscle had been damaged and after subsequent recovery, similar distension of the gall bladder or upper abdominal cavity produces marked cardiac irregularities which almost invariably terminate in ventricular tachycardia and fatal ventricular fibrillation.

Dr. McEachern and Dr. Janes have been collaborating with Dr. D. W. G. Murray (Department of Surgery) on the experimental surgery of heart valves and coronary arteries.

Continuing the general study of experimental arteriosclerosis, Dr. Smith and Dr. Hall have been studying the relation of the pancreatic secretions to arterial degeneration.

Dr. Janes has attempted to provide a collateral circulation to the kidney by means of muscle grafting in normal animals. The same procedure was carried out on hypertensive animals with a resultant decrease in mean blood-pressure.

Working with Dr. Murray (Department of Surgery), Dr. Janes has been working on autogenous venous grafts in the arterial system in the presence of infection, homologous venous and arterial grafts, occlusion of arteries as a result of suturing and ligation (including coronary artery suturing), transplantation of kidneys and the patency of glass cannulae in the arterial system with the use of heparin.

Dr. Janes has also carried out an extensive study on the problem of dosage of heparin in dogs and humans. This study, under the direction of Dr. Murray, has included cases of thrombophlebitis, pulmonary embolism, aneurysm, subacute bacterial endocarditis, thrombosis of central vein of retina and blood vessel suture, all of which have been carefully followed, with clotting times.

Mr. McArthur has been making a comprehensive chemical study of atherosclerotic plaques as obtained from fresh human aortas. Many fractions have been obtained, from which several chemical substances, previously not found in atheroma, have been isolated and studied. These various specific fractions will be injected and fed to animals in an attempt to reproduce the atheromatous degeneration.

Assisted by a grant from the Scottish Rite Masons, Northern Jurisdiction, and with fellowships provided by the Neuropsychiatric Institute of the Hartford Retreat, Mr. J. E. Goodwin and Dr. F. L. Lawson, together with Dr. W. K. Kerr, have continued their study of the changes in electrical activity of various areas of the brain as a result of insulin and metrazol shock. Later, the changes in cerebral circulation, under similar conditions, were studied. This work has been carried out as part of an extensive clinical investigation on schizophrenia in association with the Department of Psychiatry and sponsored by the Rockefeller Foundation. The physiological, pharmacological and biochemical aspects of the clinical work have been conducted by Dr. Hall, Dr. J. Doupe, Mr. D. W. Lougheed, Miss E. Melrose, and, more recently, by Dr. A. C. Burton.

Miss Lang has given assistance again this year to Dr. Dean McDonald, of St. Catharines, in connection with the problem of cholecystitis and liver function.

Mr. Lougheed and Miss Lang have been studying the biochemical changes associated with anoxia, the results of which are being applied to a more detailed study of the physiological and biochemical changes resulting from oxygen lack.

Although most of the work has been carried on without serious interruption, it has been necessary, in some instances, to shift the personnel so that the problems in Aviation Medical Research, which have been assigned to the Department, could be carried out with expedience by trained research workers.

The Biochemical Division of the Department, under Dr. C. C. Lucas, has continued the chemotherapeutic studies begun several years ago. About 140 compounds have been prepared during the year. These have been tested for antibacterial activity in the Department of Pathology and Bacteriology by Dr. P. H. Greey, using numerous different strains of haemolytic streptococci, Str. viridans, staphylococci, pneumococci (Types I, II, III, IV, VIII, IX, XII and XIX), B. coli, B. proteus and B. typhosus. Compounds thus shown to possess high bacteriostatic efficiency have been tested *in vivo*, using mice experimentally infected with mouse-virulent strains of Str. haemolyticus, pneumococci or staphylococci.

Dr. S. F. MacDonald has prepared about 75 compounds. Ammonia, aromatic and heterocyclic amines have been condensed with (a) phenol-4-sulphonyl chloride, (b) phenol-2:4-disulphonyl chloride, (c) phenol-2:4:6 trisulphonyl chloride, (d) resorcinol-2:4- disulphonyl chloride, (e) 2-nitrophenol-4-sulphonyl chloride, (f) benzoxazolone-6-sulphonyl chloride. Two further series of compounds were obtained from the derivatives of (e) and (f); (g) derivatives of 3-amino 4-hydroxy benzene sulphonamide by reducing the nitro groups of the compounds derived from (e); (h) derivatives of 4-amino 3-hydroxy benzene sulphonamide by splitting off the carbonyl group of those derived from (f).

Mr. C. Marchant and Dr. Laurella McClelland have collaborated in the preparation of upwards of fifty compounds containing aromatic, aliphatic and heterocyclic substituents replacing one of the sulphonamide hydrogens of sulphanilamide. Several related compounds containing arsenic or tin have also been prepared.

Dr. C. von Seemann has prepared a number of compounds derived from phenothiazine and thiophene, and also a few dyes by coupling diazotized sulphanilamide with substituted aromatic and heterocyclic residues.

While many of the compounds prepared by the above workers have shown considerable promise, by exhibiting *in vitro* activity against one or more species of bacteria, only about ten out of the 140 appeared to have significant value when tested *in vivo*. None of them equalled dagenan as far as streptococcal and pneumococcal infections were concerned, but several have shown appreciable activity towards staphylococcal infections in mice. The value of some of the more promising compounds is being more thoroughly investigated in mice.

Dr. Lucas, with the help of Miss Margaret Wheatley, has done further work on the fractionation of royal jelly. This work, started last year by Mr. G. F. Townsend, under Dr. Lucas, has also been receiving further study by Mr. Townsend at the Ontario Agricultural College. He has now commenced feeding experiments, using the purified fractions and substitutes for them, in an endeavour to identify the component or components responsible for the amazing development of the reproductive apparatus of the queen bee.

Miss Margaret Wheatley has assisted Dr. Lucas in further work on a rapid micro-method for semi-quantitative analysis of minute kidney stones and urinary gravel. A method has been devised which permits a fairly accurate analysis (of particles as small as 10 mg.) in less than half an hour. The method has been applied to a number of calculi obtained through the co-operation of Dr. D. R. Mitchell of the Department of Urology.

Mr. L. B. Macpherson has been studying the lipids derived from human tuberculous lungs. Abnormal amounts of fatty material occur in such lungs. A careful fractionation of this fat has revealed the absence of phthioic acid and other materials characteristic of the fatty substances elaborated by the tubercle bacillus. The evidence obtained to date indicates that the excessive quantities of lipids found in tubercle-infected lungs are due to excessive deposition of fatty material by body cells and do not arise from the tubercle bacilli.

Mr. J. M. Beveridge has continued the study of methods for separating the amino acids from protein hydrolysates in crystalline form or as characteristic derivatives. He has found that a certain sequence of separations reduces the usual errors to a minimum. The method evolved has been applied to a human hair hydrolysate with excellent results. The presence of aspartic acid, proline, hydroxyglutamic acid and serine in hair has been proven for the first time and accurate figures for the first two of these amino acids have been obtained. The quantities of cystine, arginine and glutamic acid isolated have been raised significantly above the amounts previously reported.

Dr. D. A. Irwin has continued his work on silicosis in co-operation with the Mining group and during the past year particular attention has been paid to the results of treating animals with established silicosis by means of the aluminum powder. It has been found that with aluminum therapy not only can the progress of the disease be stopped but also that the elimination of quartz dust from the lung is hastened and considerable resolution of the more acute lesions of the disease takes place.

In conjunction with the clinical use of aluminum powder, Dr. Irwin, Mr. J. H. Johnston and Mr. R. C. Smith investigated methods to produce and disperse in the atmosphere particles of metallic aluminum of sufficient fineness to permit its use therapeutically. An apparatus has been constructed that continuously produces and disperses in the atmosphere in known concentrations aluminum particles of a size capable of gaining entry to the lung alveoli. Two such machines have been constructed, with the help and advice of the Superintendent's Office, and have been supplied to the clinical investigators.

Dr. Irwin and Mr. Johnston have determined the distribution and percentage of aluminum retained in the lungs of rabbits when the exposure to aluminum dust was known in terms of the amount of air breathed, duration of exposure and concentration and size of the dust particles. The results have been valuable in establishing the conditions for the clinical use of aluminum therapy.

Mr. F. E. Chase has completed a study of the effect on the growth of tubercle bacilli of the addition to the culture medium of very dilute solutions of silicic acid. It has been demonstrated that the presence of silicic acid stimulates growth of the organisms. This finding is of importance as it explains, in part at least, the increased susceptibility of silicotics to pulmonary tuberculosis.

Dr. V. P. Collins has made a study of the pathogenesis of ocular lesions due to a variety of chemical irritants. Having established the nature of the various lesions, appropriate therapeutic measures are being explored.

Dr. Frances McKay has investigated chemical methods to estimate quantitatively the concentration of oestrone in blood and urine, in the hope of developing a more rapid method for clinical use. Blood samples have been obtained through the co-operation of the Department of Obstetrics and Gynaecology. The series has been too small to permit conclusions to be drawn as to its clinical value.

Dr. B. Mendel, with Miss D. Mundell working as an Eli Lilly fellow, and Miss F. Strelitz, continued their work on choline esterase. They found that different electrolytes in physiological amounts act as activators or inhibitors of the esterase. Calcium and magnesium ions were found to activate and potassium ions to inhibit the activity of the enzyme.

Miss Strelitz has concentrated choline esterase from large amounts of horse serum and has purified the enzyme from 400-500 times. This purified preparation, when injected intravenously into animals, increased their normal esterase activity more than 200 fold for several days. The physiological reactions of the treated animals were studied.

Miss Mundell continued the work on purification of the esterase from mouse liver. The purification has reached a stage where the enzyme can be separated from its colloidal carrier. Work is now in progress to determine the chemical nature of the enzyme.

Mr. N. R. Stephenson commenced his work on the investigation of the synthesis of casein, but for the past few months he has been working on the purification of histaminase. The kinetics of histaminase, as well as the distribution of the enzyme in various tissues, has been studied by the manometric method. Some knowledge concerning the reaction between histamine and histaminase has been obtained.

Dr. M. Wong has been investigating the eclampsia problem in experimental animals at various stages of pregnancy.

The work of the Department has been assisted during the year by grants from the following:

Banting Research Foundation.
Josiah Macy Jr. Foundation, New York.
Scottish Rite Masons, Northern Jurisdiction.
Neuropsychiatric Institute of the Hartford Retreat.
Rockefeller Foundation, New York.
Eli Lilly Company, Indianapolis.
H. MacLean, Merrickville.
Ontario Mining Association.

The Department wishes to express their thanks for this financial assistance.

The Department of Medical Research wishes to express their appreciation so the many other departments in the University which have co-operated with them during the year.

Special mention should be made of the assistance rendered by the Superintendent, the Bursar and their staffs for the wholehearted support which they have given to the Department in their work, especially in connection with the war research activities.

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ART SERVICE

(*Under the direction of Miss Maria T. Wishart*

This year has seen a change in the staff of the Art Service Department. Miss Dorothy Foster resigned as assistant medical artist last September. Miss Foster had been with the Medical Art Service virtually since its beginning when as an art student she came in occasionally to do lettering. Her able help and loyal co-operation during all this time were of great assistance in the development of the department.

Miss Foster's resignation having been anticipated for several years, it was possible to choose and have trained her successor, namely Miss Eila Hopper, of Waterdown, Ontario. Miss Hopper comes to the department with a splendid comprehensive training, graduating from the Ontario College of Art with highest honours, followed by two years with Max Broedel at Johns Hopkins Medical School, where Miss Hopper also had the additional advantage of working for a short time under the guidance of Miss Hager, artist to Dr. Walter Dandy, the brain surgeon, and Mrs. Burgess, illustrator of the Wilmar, "Atlas of Oculi Fundi."

It has been our privilege this year to illustrate Dr. Gordon Murray's vitally important work on the experimental and clinical use of heparin in surgery. We have made between forty and fifty sketches covering:

The technique of applying a venous graft.
Resection of aneurysm.
Experimental venous grafts removed at various stages.
End to end anastomosis of severed artery.
Suturing of stump of artery.
Venous graft applied to common bile duct and result of same.
Glass cannula in common bile duct.
Method of clotting time, etc.

Some of the drawings have already been used for publication, others remain as records for the time being.

From time to time in the past years we have recorded by illustration some of Dr. Harold Wookey's pioneer work on removal of the oesophagus for carcinoma. This year we completed one of these case records by illustrating Dr. Wookey's method of reconstruction of the oesophagus. Slides from these drawings were used by Dr. Wookey when he gave a paper on the above subjects at the Canadian Medical Association meeting held in Toronto in June. He further demonstrated his success by showing the healthy patient in person.

Dr. E. A. Linell brought in an autopsy specimen of an edematous brain. The specimen was quite fresh and upon cross section showed graphically the highly glazed porcelain appearance typical of this condition. The drawing of this specimen presented quite a problem, as it was difficult to portray the glazed appearance on a flat surface which normally catches no highlight.

It was a pleasant change to have the opportunity of executing an illustration on a large free hand scale, as was the case when Dr. K. G. McKenzie asked for a wall chart demonstrating extrusion of intervertebral discs involving L5 and S1. Dr. McKenzie furnished us with an excellent dissection of the lumbar and sacral vertebrae from which to sketch the key illustration. This chart along with sundry other drawings and letter charts prepared by us were made use of by Dr. McKenzie in his scientific exhibit on "Extrusion of intervertebral disc," at the Canadian Medical Association meeting, June 1940.

Several pen and ink drawings of gastric resections to remove tumours with ulcers were made for Dr. R. R. Graham. These will be incorporated in a series to illustrate a book on "The System of Operative Surgery," to be published at a later date.

Removal of a parotid gland tumour was sketched at operation for Dr. R. M. Janes. A lantern slide made from the finished drawings was used to illustrate his paper on "Excision of tumour of the parotid gland; exposure of the facial nerve as a preliminary procedure," which was presented before the Canadian Medical Association, June 1940.

Pen and ink drawings were made for Dr. Gordon Murray of the clavicle bone sectioned vertically, horizontally and crosswise to illustrate the important relationship of the parallel grooves of the medulla in the insertion of the Kirshner wire in fixation of the clavicle. These drawings are to be used shortly for publication.

A markedly developed and unusually good example of a cholesteatoma of the fourth ventricle was sketched in situ at operation for Dr. K. G. McKenzie. The drawing, which was executed in water colour, revealed clearly an important point of interest, namely the milky, pearl-like colour of the cholesteatoma.

A water colour drawing of a fundus of the right eye for Dr. W. R. Campbell was obtained through a direct ophthalmoscopic study from the patient. The case demonstrated very clearly the results of a thrombosis of the central retinal artery, showing marked segmentation of the vessels, and a wide, edematous area surrounding the cherry-red macula lutea. It was satisfactory to get an accurate record.

Dr. Ross Robertson of the Muskoka Hospital, Gravenhurst, has, in co-operation with Dr. R. M. Janes, Toronto, evolved a new approach for extrapleural pneumonolysis. This approach reduces trauma to a minimum by eliminating any necessity to cut the muscles and it also gives an excellent exposure directly over the fourth rib. Pen and ink drawings were made to illustrate a paper written on this new method which will be published in the Journal of Thoracic Surgery.

Space permits us to enumerate only some of the year's work. In all sixteen members of the Faculty of Medicine from seven departments and sub-departments have availed themselves of the Art Service.

Summary of Work of Art Service:

1. According to medium of work:

1. Water-colour	2
2. Half-tone	19
3. Pen and ink	99
4. Plaster models	1
5. Pencil drawing	4
Total	125

2. According to departments:

1. Medicine	1
2. Neuro-Pathology	1
3. Neuro-Surgery	14
4. Obstetrics and Gynaecology	4
5. Ophthalmology	3
6. Surgery	95
7. Surgery H.S.C.	7
Total	125

3. Number of members of Faculty for whom work was done 16

REPORT OF THE MEDICAL SOCIETY

Honorary President	Dean W. E. Gallie
Honorary Treasurer	Professor William Boyd
President	W. L. C. McGill
Vice-President	W. E. Ortved
Secretary-Treasurer	Page Statten
Assistant Secretary-Treasurer	W. S. Sedgwick

The Medical Society is the student organization of the Faculty of Medicine, composed of all the Medical Students of the University. The executive is elected in the spring term to carry out the business of the Society for the following year. The Society is responsible for student activities, and serves as a means of communication between students and Faculty.

The Soph-Frosh activities, handled by Doug Baird and his committee, included the annual banquet and dance, as well as the informal initiation. The dance was held at Hart House in an informal style. This resulted in a larger turnout of freshmen, for whom the dance is primarily held.

In the Fall term an open meeting of the Medical Society was held with Dr. I. B. Erb of the Hospital for Sick Children as speaker. His subject, "The Prisoner at the Bar", was most interesting and well received by the excellent student attendance. It was felt by the Society that more meetings of this type should be held.

The Medical-At-Home, successfully run by Bill Ortved and his committee, was modified this year to conform with the times. A less expensive party was arranged by supplying music by Bert Niosi, a local orchestra. The dance was thoroughly enjoyed by all who attended, but the response of the students was rather disappointing, and the committee was left with a deficit to turn over to the Medical Society.

"Daffydil", the annual Medical review, was discontinued this year on the suggestion of the Faculty. Expenses that had been incurred in preparation for the event were met by generous donations from individual members of the Faculty.

The Canadian Association of Medical Students and Internes, begun on this campus two years ago and now composed of students from all the Medical Schools in Canada, has just completed its most successful year. Early in March the third annual convention was held at Queen's University with twenty-two official representatives from eight Canadian Medical Schools. A similar meeting, but unofficial, was held in Quebec City in September. At the Kingston Convention reports were received from the organizations of the various Medical Schools on their special projects of study. The University of Western Ontario reported on its study of Book Co-operatives. The University of Toronto reported on a Student Health survey, and the incidence of Tuberculosis among medical students. The most important accomplishment of the C.A.S.I. was the announcing of Interne Appointments for the graduating class of 1940 in the Medical Schools of Canada. Bill Kerr and Paul McGoey were largely responsible for the formation of the Canadian Interne Board, and deserve a great deal of credit for their work. Appreciation has been expressed by the Interne Board to the hospital authorities whose co-operation has made the Canadian Interne Board a real success.

In order to officially incorporate the C.A.S.I. with the Medical Society, a revision of the Constitution of the Medical Society was undertaken. A committee formed to investigate found that the Constitution as revised in 1932 had many articles that needed revising. Much time and effort was spent in a complete revision. After its acceptance by the Executive, the Revised Constitution was placed in front of the student body, and passed at an Open Meeting of the Medical Society.

Included in the Revised Constitution were plans for an annual Medical Society Banquet. This is to be held in the Fall term in Hart House. The speaker is to be Brigadier Eric Haldenby and his subject is to be of popular interest. An excellent turnout of students is anticipated at this affair.

The Medical Journal has had a most successful year under the leadership of its Editor-in-Chief, Ken Greer. Its articles prepared by staff members and students are of great value to students. The papers for the most part reviewing the current views on subjects of clinical interest, bring the student up to date and form an important part of the supplementary reading in conjunction with the courses of the curriculum. Special credit for the final issue of the Journal is due to Jack Denne and Norm Hilliary. The issue contained a report of the C.A.M.S.I. convention and the work of this organization since its formation. A copy was presented to every medical student in Canada, and additional expenses were met by the increased advertising space procured by the work of Jack and Norm along with Doug Bryce.

Bill Ortved, who has spent the last three years in preparation as a member of the executive, has been acclaimed President of the Medical Society for next year. Along with his capable executive the affairs of the Medical Society are in excellent hands.

MEDICAL ATHLETIC ASSOCIATION

Honorary President	Professor R. F. Farquharson, M.B., F.R.C.P.(C)
President	J. A. Boyd
Vice-President	M. P. Townsend
Secretary-Treasurer	D. R. Clark

The Athletic Association has increased the number of teams in intramural competition from twenty-four to twenty-six during this past year in an effort to capture the T. A. Reed Trophy. When the final standing was made known our faculty was in fourth place.

The expenditures of the Association were approximately the same as in previous years but we were unable to keep them within the limits of the grant of the Medical Society. This failure may be attributed to the facts, firstly, that there were more teams in competition and secondly, that, after the current budget had been drawn up, war conditions caused a rise in all costs of the Association from 10 to 20%, and in addition the Association did not receive the usual sum of money in the grant from the Medical Society. This debit will of necessity be assumed by next year's executive in its budget.

Meds won two senior championships during this past year. These were the Waterpolo and Badminton titles. The first and second year men also won the Junior Track, Harrier, and Swimming titles.

There were thirty-two Medical "M" 's awarded this year and will be presented to the winners at the first annual banquet to be held by the Medical Society in the fall of 1940. The members of the senior championship teams will also receive bronze medallions at this time.

The "Athletic Cane" went to "Jersey Jim" Emmett for his keen interest in interfaculty sports during his entire six years in the course. Enthusiasm such as Jim has shown is a great help in stimulating interest in Medical Athletics.

We were represented in intercollegiate circles this year by Jim Murray in Rugby; Hampson, Mendlesohn, Robinson, and Clarkson in Swimming; Best and Baldwin in Waterpolo;

Spohn and Prowse in English Rugger; Baird in Soccer; MacDonald in Rowing; Delaney in Track and Harrier; and "Clint" Stephens in Golf.

The James Kinnear Memorial Trophy, emblamatic of squash supremacy in our own faculty, went to "Pete" Spohn 4T3. There were some fifty-four entries in this year's tournament.

The Constitution and By-Laws of the Association were revised and brought up to date this year by the executive committee.

This year's executive committee, on the suggestion of "Mac" MacCutcheon of Hart House, has made a study of an intrafaculty individual point system now in use in University College. It is hoped that with this study as a foundation some such system will be adopted by our Association next year in an effort to further stimulate interest in Medical Athletics.

MEDICAL WOMEN'S UNDERGRADUATE ASSOCIATION

Honorary President	Dr. Marjorie McIntyre
President	Helen Holden.
Vice-President	Alice Whiteside
Secretary	Ming Chong
Treasurer	Elizabeth Harrison

The Medical Women's Undergraduate Association enjoyed five meetings during the year 1939-40.

In the Fall the women of the Class of 4T5 were welcomed into the Association. At this meeting, which took the form of a Candle Lighting Service, the President, Helen Holden, stressed to the incoming students the opportunities for service offered to medical people.

At the November meeting the Association was privileged to hear from Mrs. M. W. Wallace, and Mrs. W. E. Gallie. They addressed the meeting on the subject of the Red Cross Society, mentioning several paths which the members of the M.W.U.A. can follow to help in its work.

The annual Christmas gathering was the next event, when Santa Claus was a jolly visitor. Toys and canned goods, brought to the party by the members, were later taken to the University Settlement for distribution to needy families.

In the Spring the "Nabob" Tea took place, at which the students were at home to their professors and their wives and to women doctors of Toronto.

The closing meeting in March took the form of a beautiful chapel service in Knox College, arranged by the M.W.U.A., the Medical Alumnae and the Medical Women's S.C.M. A most helpful address to the Graduating Class was given by Dr. Elizabeth Stewart.

MEDICAL WOMEN'S ATHLETIC ASSOCIATION

President	Marjorie Mosbaugh
Vice-President	Lillian Karmalaska
Secretary-Treasurer	Margaret McFarlane

The 1939-1940 session has closed, and we can all look back on it as a year full of athletics and fun. We must admit that we as a group do not stand out as Interfaculty Champions, but as individuals we are not bad, and, with practise, we'll make the grade yet.

Marjorie, I am sure, has filled us all with enthusiasm, and we are looking forward to the coming year with keen anticipation.